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Chemicals and Polymers of Concern

Preparing for intersessional work ahead of the fifth meeting of the intergovernmental negotiation committee on the Global Plastics Treaty (INC-5)

Acknowledgements

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1. Context and purpose

Following Resolution 5/14 of the United Nations Environment Assembly in early 2022, to negotiate an international legally-binding instrument to combat plastic pollution, including in the marine environment, the Intergovernmental Negotiation Committee (INC) met from 23 to 29 April 2024 in Ottawa, Canada, for the fourth time. After three sessions, in which a general exchange of views (Punta del Este, Uruguay, in autumn 2022), was followed by a more structured development of elements and options of the agreement (Paris, France, in spring 2023), as well as first negotiations on text (Nairobi, Kenya, in autumn 2023), negotiations for the Global Plastics Treaty advanced gradually, with delegates at INC-4 further elaborating the revised draft text of the Treaty. However, progress has been hampered by stark divisions between nations advocating ambitious measures and those preferring less stringent ones.

In order to advance negotiations ahead of the fifth and final round of negotiations taking place in Busan, South Korea, from 25 November to 1 December 2024, the Committee mandated two ad hoc intersessional open-ended expert groups to further elaborate on a number of key issues. Both groups will meet from 24 to 28 August 2024 in Bangkok.

1. **Group 1:** This group is tasked with developing an analysis **of potential sources and means of financing** that could be mobilised for the implementation of the objectives of the instrument. Their work includes exploring options for the establishment of a financial mechanism, aligning financial flows, and catalysing finance.

2. **Group 2:** The focus of this group is to analyse criteria-based and non-criteria-based approaches concerning **plastic products and chemicals of concern**. They will concentrate on the recyclability and reusability of plastic products, considering their uses and applications.

In order to inform stakeholders on the issues of relevance for Group 1, the SWITCH Asia Programme has published a policy brief on the different options for financing the implementation of the Global Plastics Treaty.

The Policy Brief at hand aims to offer SWITCH-Asia stakeholders a concise overview of the issue of chemicals and polymers of concern in plastics. It lays out why chemicals and polymers of concern are problematic, both with regard to human health and the environment, and for the transition towards a circular economy where the harm that plastics cause is curtailed. It further highlights why existing international regulations through multilateral environmental agreements (MEAs) are insufficient, and what the current state of negotiations in the INC (as of June/July 2024 intersessional period of INC-4 and INC-5) suggests for the Global Plastics Treaty. Lastly, it outlines what is known about positions of the countries in the SWITCH-Asia Region on the issue.

2. The problem with chemicals and polymers in plastics

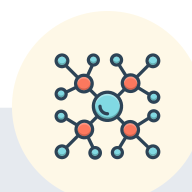
A broad perception exists of plastic pollution being a waste problem: mismanaged plastic waste is found everywhere on the planet, in oceans, rivers, lakes, beaches, urban areas, as well as in agricultural fields and nature. The impacts of plastic waste include harm to marine life, disruption of ecosystems, soil degradation, water pollution, and ultimately, pose health risks to humans. This is because plastics do not decompose and "disappear" like organic substances do, but merely disintegrate, breaking down into smaller parts. These parts and particles are ingested by marine wildlife and land animals, even bees, making their way up the food chain into human bodies.

The obvious solution seems to be to improve waste management and increase recycling, so that there are less mismanaged plastics, and fewer particles ending in our bodies. However, the problem is more complex.

Pollution from plastics does not only occur at the end of life of a plastic product but throughout its lifecycle. To understand the potential adverse effects on human health and the environment, and even the often-proclaimed solutions to plastic pollution (i.e. waste management and recycling), it is important to first understand what plastics are made of and, second, to explore the potential exposure risks for plastic chemicals along the lifecycle.

2.1 Polymers and additives

Often, the terms plastics and polymers are used synonymously. However, plastics consist of much more than polymers and monomers (see box). In order to give plastics the properties that make them so versatile and easy to use (durability and flexibility; diverse colours, different levels of transparency, thickness), a broad range of chemicals are added to the polymer-mix. A recent study conducted by PlastChem (Wagner et al., 2024), on behalf of the Nordic Research Council estimated that more than 16,000 chemicals are potentially used in plastics, of which less than 1% are known to be safe (i.e. not hazardous). For most of these plastic chemicals (currently 66%, i.e. more than 10,000 chemicals), there is a lack of hazard data This means, it is currently impossible to assess whether these can be safely used or not; yet they are being used regardless, for in most cases there are no regulations prohibiting their use in plastics or only in plastics for certain applications. Around 4,200 (26%) of the plastic chemicals are considered hazardous and around 1,200 (7%) are considered less hazardous chemicals.



A monomer is a small, simple molecule that can bind to other similar molecules to form a polymer. Examples of monomers used in plastics include ethylene, propylene, and vinyl chloride. A polymer is formed when many monomers join together in a chemical reaction called polymerisation. The resulting large molecule has unique properties that make it suitable for various applications. Examples of polymers in plastics include polyethylene (formed from ethylene monomers), polypropylene (formed from propylene monomers), and polyvinyl chloride (formed from vinyl chloride monomers).

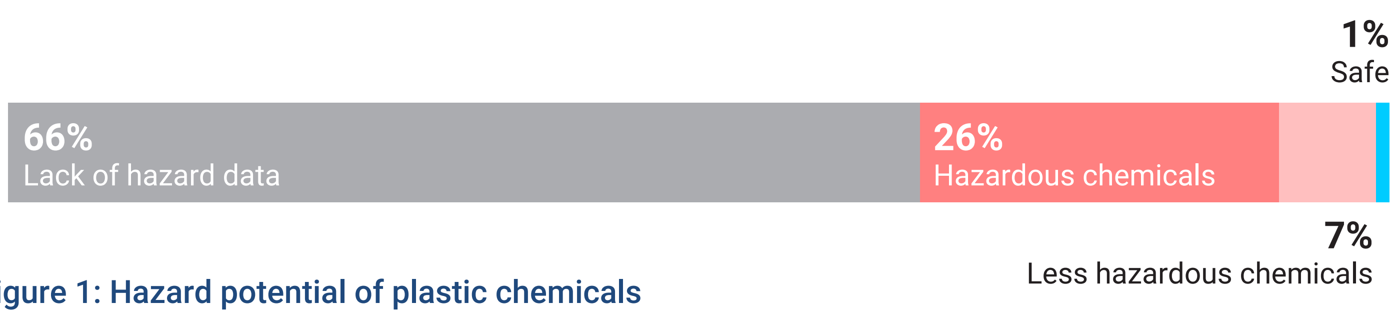


Figure 1: Hazard potential of plastic chemicals

Source: Data from Wagner et al., 2024; graphical presentation: Author's work

But what exactly are the criteria for a chemical to be considered “hazardous”? According to the PlastChem report (2024), a hazardous chemical is one that is **persistent** (i.e. it lingers in the human body or the environment), **bio-accumulative** (i.e. it accumulates in the tissue of humans or wildlife), **mobile** (i.e. it is moving around fast and far), and/or **toxic** (i.e. it is carcinogenic, causes mutations, has negative effects on reproduction or disrupts the endocrine system, or is toxic for a specific organ). Toxicity may also relate to “aquatic toxicity [which] is [a] hazard trait for environmental toxicity following the EU’s REACH regulation” (Wagner et al., 2024, p. 36). It should be noted that under current global regulations (or lack thereof) additions of hazardous chemicals to polymers are legal, even though the societal and environmental harms caused are high.

Of the hazardous chemicals under review by the PlastChem team, the majority were found to be toxic (4,184), whereas fewer were categorised as persistent (375), bio-accumulative (237), or mobile (139). A number of plastic chemicals have more than one hazardous property (ibid.). In addition to the chemicals outlined below, some researchers also proclaim that micro-plastics are “persistent, bioaccumulative, and toxic” and should therefore also be considered hazardous (Weis and Alava 2023).

Table 1. Most commonly used hazardous plastic chemicals and their uses

Chemical	Application
Bisphenols (e.g. BPA)	Commonly used in the production of polycarbonate plastics and epoxy resins. Found in products such as water bottles, food storage containers, and the linings of food cans. BPA is known to adversely effect reproductive capacities of women (and probably also men).
Phthalates	Used to make PVC plastics more flexible. Found in products like vinyl flooring, shower curtains, and children’s toys. Phthalates are associated with reproductive disorders and some of them are acknowledged to be endocrine disruptors. Some studies have also found connections between phthalates dust and asthma in children. Other studies established links with phthalates and cardiovascular diseases as well as with obesity in women.
Polybrominated diphenyl ethers (PBDEs)	Used as flame retardants in a variety of products, including electronics, furniture, and building materials. PBDEs are listed as a persistent organic pollutant (POP) under the Stockholm Convention due to their persistence and toxicity regarding endocrine disruption, problems caused in the development of the nervous system, and of the reproductive system.
Per- and polyfluoroalkyl substances (PFAS)	Used in non-stick cookware, water-repellent sports gear, stain-resistant carpets, and some firefighting foams. PFAs, also known as “forever chemicals”, accumulate in specific organs such as the liver or kidney and also the brain, causing cancer, deaths of new-born children, and endocrine disruptions, while also delaying physical developments.
Polycyclic aromatic hydrocarbons (PAHs)	Can be released from the degradation of certain plastics found in coal tar, crude oil, and some pesticides. Several PAHs are known to cause cancer, mutations in genes, and to be toxic for reproduction.
Heavy metals such as Lead and Cadmium	These heavy metals can be used as stabilisers or colorants in plastics, particularly in PVC products. Heavy metals are known to negatively impact the brain and the nervous system, and several other organs. They are also toxic for the aquatic environment.

Chemical	Application
Chlorinated paraffins (Short-, Medium and Long-chained chlorinated paraffins, SCCPs/ MCCPs/LCCPs)	Used as secondary plasticisers and flame retardants in PVC formulations. Found in products like PVC cables and flooring. SCCPs are also listed as POPs under the Stockholm Convention.

Source: SWITCH-Asia PSC, after UNEP & BRS Secretariat (2023, pp.11-18)

2.2 Exposure to plastic chemicals across their lifecycle and sectors

In its simplest form, the lifecycle of plastics and plastic chemicals consists of three stages: production, use, and end-of-life1. During the production phase of polymers as well as of plastic chemicals, exposure to chemicals and unintended by-products affect workers as well as communities living in the vicinities of production sites. If leaching, chemicals can contaminate waterways and drinking water, and accumulate in wildlife as well as in humans (UNEP & BRS Secretariat, 2023). Although these exposures pose a threat to human health, they are limited in scope and geographic area. The picture looks different for the use-stage of the plastic lifecycle; plastic products are omnipresent in today's society. As such, plastic chemicals find their way into the human body through inhalation of air-bound chemicals, ingestion of chemicals that have leached into food from packaging and through skin-contact, for example from textiles, furniture, or toys (the latter also serve as sources of ingestion in infants) (UNEP & BRS Secretariat, 2023). The report by UNEP and the BRS Secretariat (2023) further lists 10 sectors in which plastic chemicals are predominantly used.

Table 2. Priority-use sectors for chemicals in plastics

Sector	Application
Toys and children's products	Hazardous substances are particularly problematic in children's toys due to the fact that children ingest such substances by putting the products into their mouths. Also, their low body weight leads to comparably higher concentrations of chemicals in their bodies, which coincides with a greater vulnerability to chemical risks to their development. Chemicals found in children's products and toys include endocrine disruptors such as BPA, heavy metals such as lead and cadmium, or phthalates, among others. While many of these are regulated at, for example, the EU level, developing countries in particular often lack the regulatory capacities to take appropriate actions.
Furniture	The chemicals and polymers used in furniture are usually flame retardants, many of them are known to be persistent organic pollutants. While humans and animals are exposed during everyday use, exposure levels drastically increase in case of fire through resulting fumes and smoke. Efforts are undertaken in several parts of the world to regulate and limit the use of flame retardants to less hazardous alternatives.

1 Usually, a differentiation is made between the production of raw materials and the manufacturing of products.

Sector	Application
Packaging (including food-contact materials)	Although the additives to food contact materials are mostly under strict scrutiny, there are still more than 1,000 different chemicals, including at least 325 hazardous chemicals, present in food packaging. The problem with food packaging in particular is that, depending on the time of contact with the food, as well as the temperature of storage, they find their way into the food and thereby into the human body. Hazardous substances in packaging are also prone to harm the environment, including the marine environment, since they constitute the majority of (mismanaged) plastic waste. Packaging materials that end up in the environment also cause a problem through their degradation into micro-plastic particles, which if contaminated with hazardous chemicals, are ingested by and cause harm to wildlife.
Electrical and electronic equipment (EEE)	Although the quality of the plastic used in EEE is higher than that used in, e.g., packaging, it is often contaminated with "legacy additives", including persistent organic pollutants. This makes EEEs difficult to recycle, requiring particular separation techniques. Regardless, hazardous chemicals find their way into consumer products through recycling of waste electrical and electronic equipment. Some regions, such as the European Union, started to ban the use of certain harmful substances (e.g. halogenated flame retardants) in EEE in 2019. The application of bans, however, is not widespread and EEEs are shipped across the globe, making the chemicals they contain hard to track.
Transport	The plastic content in cars has doubled, on average, from 100 kg per car in the 1980s to 200 kg by 2014. Volatile organic Compounds (VOC) emissions from car interiors, particularly from plastics, degrade air quality, with high levels of aromatic compounds like toluene and styrene. VOC pollution decreases with age of car and lower in-cabin temperatures. Plastic additives such as brominated or organophosphate flame retardants and phthalates are significant pollutants inside cars. Environmental releases from tyres and end-of-life plastic waste contribute to widespread contamination. Airplanes also use many flame retardants, of which high concentrations are found in dust samples. The automotive industry has created the Global Automotive Declarable Substance List to manage substance use in vehicles.
Personal care and household	Personal care and household products can expose humans and the environment to harmful chemicals through various pathways. These products often contain plastic-related additives such as microbeads or silicone-based resins. Humans can be exposed to these chemicals through skin contact, inhalation, and ingestion from the significant amounts used in cosmetics and personal care items. Plastic packaging of these products also poses a risk as chemicals can migrate into the products and be released into the environment, contributing to marine pollution. Regulations in the EU, China, Brazil, Canada, and the US aim to control these chemicals, with measures like bans and voluntary phase-outs helping to reduce exposure.

Sector	Application
Medical devices	In hospitals and healthcare centres, numerous single-use plastic medical devices are widely used, such as intravenous tubing, catheters, and blood bags. PVC accounts for about 40% of these devices, with Di(2-ethylhexyl) Phthalate (DEHP) as the primary plasticiser. DEHP is toxic to reproduction and is regulated in Europe and South Korea due to its potential to leach into biological fluids during medical procedures, posing high exposure risks, especially to babies. Burning polyvinyl chloride (PVC) medical waste in non-compliant incinerators can release harmful chemicals, contaminating the food chain. Additionally, (Perfluorooctanoic acid) PFOA and related substances are used in certain medical devices and implants, with exemptions under the Stockholm Convention.
Building materials (including secondary building materials)	Hazardous chemicals are still used in sealants and paints, while legacy chemicals, used in older constructions until the 1970s, continue to pose exposure risks in impacted buildings, which also complicates the recycling of construction and demolition waste. Newer sealants may also contain hazardous chemicals. Chemicals in building materials can emit indoors, degrading air quality and accumulating in house dust, leading to human exposure. A screening identified 55 chemicals of high concern, particularly formaldehyde, in building materials. These materials have long service lives, posing waste management challenges.
Synthetic textiles	Polyester, nylon, acrylic and other synthetic fibres now make up over 60% of global clothing materials. In 2016, 65 million metric tonnes of plastic were produced for textile fibres. These synthetic fibres are cheap, versatile, and provide various benefits like stretch and warmth but require more flame retardants due to their flammability. Several persistent organic pollutants such as PBDEs, SCCPs, Perfluorooctanesulfonic acid (PFOS), and PFOA have been used in textiles for vehicles, public spaces, and protective clothing. PFOA have exemptions under the Stockholm Convention for specific uses in textiles. These chemicals are not labelled on textile products, making it difficult for consumers to make informed choices and for recyclers to handle these products safely. This lack of labelling also complicates compliance with regulations prohibiting the recycling of products containing POPs.
Agriculture, aquaculture and fisheries	Plastics are extensively used in agriculture to enhance crop yields, reduce food loss, and improve food security. In 2018, 12.5 million metric tonnes of plastics were produced for agricultural purposes. These plastics are used in various applications, including polymer coatings for fertilisers, mulching films, greenhouse films, ear tags for livestock, and fishing nets in aquaculture. The widespread use of agricultural plastics raises concerns due to the difficulty in collecting and recycling them, leading to soil contamination with plastics and microplastics. Open burning on farmlands can release harmful chemicals such as phthalates, bisphenols, and POPs. Additionally, biosolids used as fertilisers can introduce microplastics into agricultural soils, and pesticide containers can contaminate the plastic recycling stream with hazardous substances like PFAS.

Source: Adapted from UNEP and BRS Secretariat (2023, pp.19-24)

At the end-of-life stage of the plastics lifecycle, chemicals leach from sources of open burning, dumped plastic waste, and landfills. Furthermore, together with the plastic wastes themselves, chemicals travel across waterways and national borders, spreading their negative impacts (UNEP, 2023).

The case of Bisphenols

Bisphenol-A (BPA) is one of the most often-used additive in plastics. Through extensive research, it became apparent that BPA is also a toxic endocrine disruptor. Consequentially, its use was banned in the European Union (EU) in 2018 in materials that come in contact with infant food (EU No. 201/213). Following an updated scientific opinion by the European Food Safety Authority (FSA), which drastically reduced its estimation for the Tolerable Daily Intake (TDI) of BPA by 20,000 times, the European Commission has initiated a ban on BPA in all food-contact materials (FCMs). The ban is expected to come into force in 2025. Additionally, the Commission expects to delete BPA from a positive list of substances in regulation EU No. 10/20211 on plastic materials and articles intended to come into contact with food (CIRS, 2024).

In response to these developments, producers and manufacturers started to market products as “BPA-free”. However, as the general properties of BPA were still desired in the products, alternative bisphenols were developed and introduced into the market. Unfortunately, these alternatives transpired to be at least equally (eco-) toxic as BPA (Reininger & Oehlmann, 2024).

This example illustrates that

1) Hazard evaluations of substances can change over time, with additional research and examinations undertaken.
2) Even if a substance is regulated in one region (here, the member states of the European Union), it may still be produced, sold, and used elsewhere in the world.
3) Regulations in one part of the world can change consumer perceptions and responsive marketing strategies elsewhere.
4) BPAs are only banned in food-contact materials, which potentially allows their use in other plastic products, for example, (up to a certain quantity) in children’s toys.
5) Had the entire group of bisphenols been regulated, the regrettable substitutions could have been avoided, and resources for research and development could have been directed towards preferable substitutes.

3. Influence of chemicals of concern on circularity

A broad agreement exists among experts and practitioners that the current linear model of plastic production, manufacture, use, and disposal is highly problematic. Valuable resources are being wasted while the planet is drowning in plastic waste. In a circular economy, plastic products would be designed so that less resources are used, overall production is curbed, and products can be re-used or recycled. Only if re-use or recycling were impossible, products would be disposed of in an environmentally sound manner. From a resource efficiency standpoint, the reduction of waste, and, ultimately, the limiting of virgin plastic production, is the most desirable option, followed by re-use. Recycling should only be implemented if a product cannot be reduced or re-used. This is due to the fact that all recycling methods require extensive energy use, and the quality of materials is downgraded in each recycling cycle. So-called chemical recycling is even less desirable, since its energy use is higher and the resulting chemical by-products are highly hazardous. Waste-to-energy “recycling” is a form of incineration in which the energy produced during the burning process is further used. Incineration, whereas better than dumping or open burning, still releases a multitude of hazardous chemicals. Landfills, while counting as an environmentally sound manner of plastic waste disposal, remain a source of leaching chemicals into the environment. Therefore, they should remain a last resort for disposal. In addition, global capacities for landfills are limited and the sheer amount of plastic waste currently being produced would quickly overburden them.

While the concept of a circular economy with a limited plastics burden is promising, there are several obstacles to its implementation for the current plastics system globally, especially when focussing on the downstream (here: recycling) part of the concept of non-linear plastics. **Economically**, recycled plastics cannot compete with virgin materials due to the expenses involved in collection, sorting, and processing. In addition, virgin plastics materials are highly subsidised, including through a lack of producer responsibility for its waste stage. The higher costs of recycled materials are coupled with a lack of market demand for them due to their perceived or actual lower quality. Additionally, **logistical issues** such as inefficient collection systems, contamination in recycling streams, and disparities in recycling infrastructure exacerbate the problem. Furthermore, **technical limitations**, such as inadequate recycling technologies and the complex nature of plastic materials, hinder efficient processing.

Polymers of concern include those that are unfit for reuse or recycling, and/or that have a high potential to leak micro- or nano-plastic particles into the environment. As such, their production and use are hindering the transition towards a “circular plastics economy”[2] (Wagner et al., 2024).

Likewise, chemicals of concern in plastics play a crucial role in determining the reusability and recyclability of products. Specific problems include

- **Transparency:** the lack of transparency across the value chain makes it difficult for users and recyclers to decipher whether or not a product contains a hazardous chemical.
- **Mixing chemicals:** in addition to the issue of lacking transparency, the sheer mass of chemicals with similar properties make it difficult to sort products for recycling, leaving a high risk of mixing a number of chemicals in the process. The chemicals-mix has the potential to render the recycled material unsafe for many of the applications for which virgin plastics are used (e.g. for food contact) (Wagner et al., 2024).

2 Note: A “circular plastics economy” at current production levels is impossible. As such, (regulatory) measures will be required to substantially reduce the overall production and consumption of plastics. These are being negotiated under different parts of the Global Plastics Treaty, and will therefore not be further elaborated at this point.

- **Accumulation of chemicals:** even when one product is being recycled into the same product (e.g. PET bottles into PET bottles) the chemicals contained in the original set of bottles (e.g. bisphenols) are likely to accumulate over time. This happens because further stabilising chemicals need to be added to the recycled material that deteriorates with each recycling cycle, thus leading to higher concentrations of chemicals in the recycled bottles (UNEP & BRS Secretariat, 2023).
- **Damages to recycling infrastructure:** some chemicals are known to damage the recycling machinery, such as crushers or moulders (Wagner et al., 2024).

These aspects of chemicals of concern significantly impede the advancement of a "circular plastics economy". Recycled plastics, which are already at a competitive disadvantage compared to virgin materials, are rendered even less attractive through potentially added chemicals. Additionally, the diverse array of chemicals present complicates the sorting and processing of recyclable materials, making these processes even more laborious and costly. The existing complexity might be to deter an increase in market demand for and eventually (with increased consumer awareness) also consumer acceptance of recycled plastic products. To deal with harmful chemicals as a primary source of contamination in recycling streams, recycling infrastructure must be even more complex and cost-intensive. This places countries with limited resources at a disadvantage, as they lack the capability to invest in such sophisticated recycling technology.

Another aspect regarding the issue of a circular economy and chemicals of concern is the fact that in many countries (predominantly developing countries), plastic waste collection and recycling is undertaken by waste workers who are not formally organised or protected. They often do not have access to information about additives and even fewer capacities to separate plastics according to the chemicals they contain, thereby being exposed to these substances, and increasing the risk of mixing and accumulation of chemicals of concern. In consequence, waste workers' health is put at risk, a circumstance that is exacerbated by the practice of open burning of low-value plastic waste, which releases and creates hazardous chemicals (UNEP & BRS Secretariat, 2023). Also, extending the use time of plastics after sorting, or the recycled products themselves, may be hazardous for waste workers and consumers as wear and tear of plastics can lead to exposure to chemicals of concern.

For these reasons, developing and implementing global regulations on harmful chemicals in plastics—such as banning certain highly hazardous chemicals, limiting the variety of chemicals used to those that are safer, and enhancing transparency in chemical usage—are necessary for a circular economy with a limited plastics burden, which will also have direct benefits for human health and the environment.

4. Insufficiency of existing Multilateral Environmental Agreements

When the issue of chemicals and polymers of concern arises during the negotiations of the Global Plastics Treaty, the Basel, Rotterdam, Stockholm, and Minamata Conventions as well as the Montreal Protocol on substances that deplete the ozone layer are often mentioned. The argument against a provision regarding chemicals of concern under the Plastics Treaty is usually that there are existing MEAs and any duplication of efforts should be avoided (see e.g. UNEP, 2023, p. 18).

While there is a strong case for avoiding that two MEAs compete in their work, it must be understood that the existing conventions only cover a fraction of the hazardous chemicals potentially used in plastics. More precisely, of the ~4,200 plastic chemicals that were identified as hazardous, the Basel Convention covers 487, the Stockholm Convention covers 462, the Minamata Convention 26, and the Montreal Protocol covers 10. An additional 151 chemicals are regulated under the Rotterdam Convention, though these were excluded from the cumulative 6% of chemicals regulated under MEAs, since this Convention only prescribes that information must be exchanged prior to importing or exporting the chemicals between the trading countries. Furthermore, the Basel and Rotterdam Conventions only cover specific parts of the lifecycle of these plastic chemicals, i.e., the waste stage and trade respectively (Wagner et al., 2024).

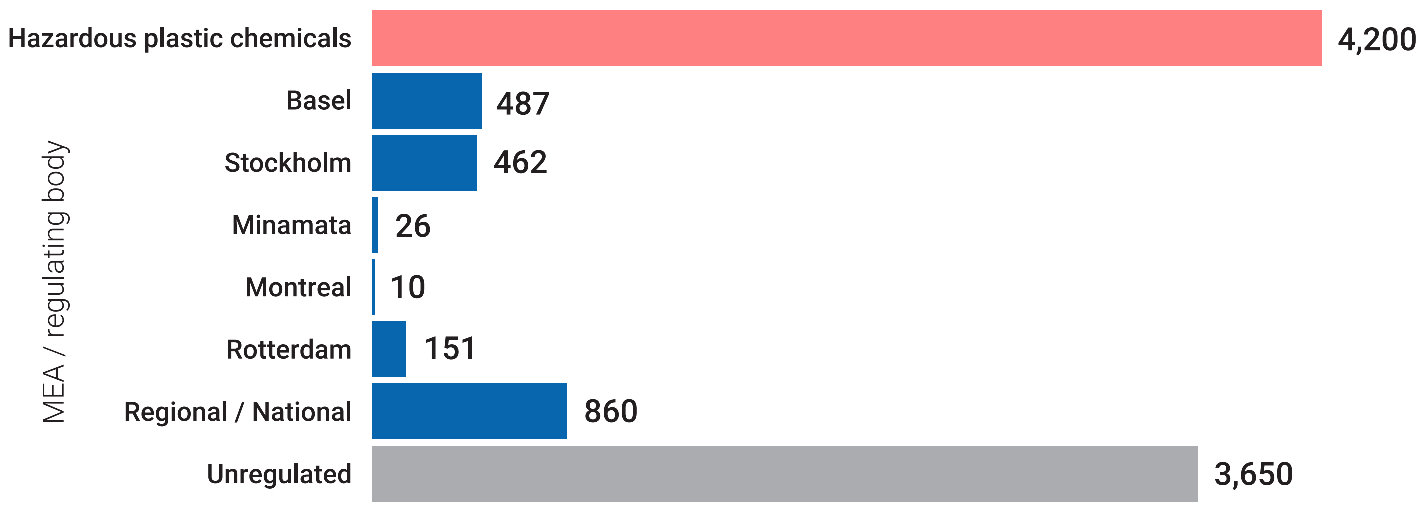


Figure 2: Number of internationally regulated hazardous chemicals compared to total number of hazardous chemicals

Source: Data from Wagner et al., 2024; graphical presentation: authors' work

Roughly 860 of the hazardous plastic chemicals are regulated either nationally or regionally, highlighting the need for global cooperation on the issue. It must be noted that these numbers focus only on those hazardous chemicals for which sufficient hazard data are available. This leaves around 3,650 hazardous plastic chemicals internationally unregulated. For the moment, more than one-third thereof (42%, i.e. ~ 1,520) are known to be used and/or are detected in plastic materials or plastic products despite their known toxicity (Wagner et al., 2024). The number of unregulated hazardous chemicals depicted might therefore increase, once hazard data for the more than 10,000 remaining chemicals emerge (i.e. 66% of the chemicals identified by the PlastChem Report).

5. Current state of negotiations at the Intergovernmental Negotiation Committee

The regulation of chemicals and polymers of concern through the Global Plastics Treaty has been proposed from the very outset of negotiations. Several states and groups of states had suggested a provision on this issue in their submissions and it also found its way into the Zero Draft (UNEP, 2023) prepared by the INC-Chair ahead of INC-3 in Nairobi in 2023.

The Zero Draft outlined three options on how chemicals and polymers of concern could be regulated under the Global Plastics Treaty.

1) **Each Party** must take steps to **prohibit and eliminate** the use of certain chemicals in the production of plastics by **specified dates**, as outlined in **an annex** of the Treaty with exceptions noted in that annex. Additionally, each Party must also prohibit and **eliminate** the **production**, **sale**, **distribution**, **import**, or **export** of **plastics containing these chemicals** by the same dates, again with specified exceptions.
2) **Parties** must take steps to **minimise** and, **if possible, eliminate** harmful chemicals in plastics that could negatively impact human health or the environment, or hinder safe management of plastics throughout their lifecycle. Additionally, **each Party** must **regulate or prohibit** the use of **specific chemicals listed in an annex** of the Treaty, and include these measures in their **national plans**.
3) **Each Party** must take steps **to prohibit or regulate** the use of harmful chemicals in plastics that could affect human health or the environment, or hinder their safe management, **according to criteria** in an annex of the Treaty. These measures must be included in the **national plan** as outlined in the part of the Treaty regarding national plans.

The differences among the options refer to

- the kind of **legal obligation**, i.e., an individual legal obligation (1, [2][3] and 3) or a collective legal obligation to act (2)
- the provisions laid out in the respective **annexes**, i.e., timelines (1), specific chemicals (2) and criteria (3)
- the **extent of regulation**, i.e., whether chemicals of concern in plastics should be prohibited and eliminated (1), minimised and only eliminated, if possible (whereby judgement of the possibility for eliminations will lie with the states[4]) (2), or either prohibited or merely regulated (3)
- whether **the same global goal** is set for all countries, i.e., top-down (1) or whether countries themselves **set their own, nationally determined goals, taking into account national circumstances** in national plans, i.e., bottom-up (2 and 3) (Busch, 2024).

It should be noted that the current draft text also contains a provision related specifically to the trade of chemicals of concern. This provision is strongly connected with the provision on chemicals and polymers of concern, but makes additional suggestions for import and export of the chemicals mentioned under the provision discussed in this Policy Brief. The provision on trade relies strongly on what is negotiated in the main provision, as well as on countries' views on the extent that trade issues can or should be regulated outside the realm of the World Trade Organisation. For these reasons, the provision is not discussed further in this Brief.

3 Option 2 suggests both a collective legal obligation (parties) and an individual legal obligation (each party).
4 This specification is a deliberate attempt of states to lower the ambition of the provision.

While the text set out in the Zero Draft has been easy to read and understand, textual negotiations and streamlining efforts at INC-4 have led to a colossal, heavily bracketed text proposal[5] of more than 1,700 words (excluding annexes). The current title "[Cooperation and coordination with relevant MEAs on] [[**Chemicals** [**and polymers**] **of concern** [in [plastics and] plastic products]]" and the alternative title: "[***Alt title*****: Hazardous chemicals** [in plastics and plastic products] **of concern]**" suggest the diverse views of negotiating parties on how to interpret the scope of the provision. The following table aims to give an overview of what the insertion or deletion of bracketed text implies.

Table 3. Explanations of treaty formulations

Formulation	Description
[no provision]	While most countries support some form of provision[6] on the issue of chemicals of concern, some countries (e.g. Bahrain, Cuba, Iran, Kazakhstan, Kuwait, Russia, Saudi Arabia, Oman, Malaysia and Qatar) reject any provision on the issue.
[Each Party] [Parties]	While "each party" implies an individual legal obligation for every member state to take action, "parties" implies a collective legal obligation. Collective legal obligations leave room for interpretation on whether or not a specific party needs to act.
[shall] [should] [is encouraged]	This set differentiates between mandatory ("shall") and recommended or optional ("is encouraged" or "should") actions for the parties involved. It reflects different levels of commitment that might be negotiated.
[and polymers]	The formulation is frequently used in conjunction with "chemicals", expanding the scope of discussion to include both chemicals and polymers. An exclusion of "and polymers" would potentially limit the scope of the provision (even though polymers are chemicals by definition).
[in [plastics and] plastic products]	The point of disagreement in the inclusion or exclusion of "plastics" in addition to "plastic products" refers to the different forms of plastics that should be regulated (i.e. the scope of the provision). Targeting only plastic products would greatly limit the scope to final products as it would exclude any regulation of virgin plastics (e.g. pellets). Similarly, the responsibility for limiting the addition of chemicals of concern would lie with manufacturers of plastic products and less so with the producers of primary plastic polymers.
[to prohibit or] to regulate, [as appropriate]	Offers options on the regulatory approach, varying from prohibition to regulation. Regulation is the much weaker term, since it does not necessarily imply that a chemical cannot be used any more. In theory, it would suffice to have a regulation prescribing that the chemical needs to be handled with greater care during the production process. The inclusion of "as appropriate" leaves room for parties to choose the less ambitious option (here: to regulate).

5 The text proposal has not been officially published yet. For the latest version, view "29/04/2024 \| Non-paper: Co-facilitators' non-paper on subgroup 1.2 outcomes (Clean)"

6 In a treaty, a "provision" refers to a specific clause or article that outlines obligations, rights, or procedures agreed upon by the parties. For example, in the Paris Agreement, key provisions include Emission Reduction Targets (Article 4), Financial Support (Article 9), and Transparency and Accountability (Article 13). Provisions are essential for detailing the commitments and ensuring the effective implementation of the treaty's objectives.

[taking into account common but differentiated responsibilities and respective capabilities]	Acknowledges that different parties may have different capabilities and responsibilities in international agreements. The principle was formally established during the Earth Summit in Rio de Janeiro in 1992 and included in the Rio Declaration on Environment and Development. It was further included in several other MEAs, most prominently in the United Nations Framework Convention on Climate Change (UNFCCC). The principle serves to account for equity, historical responsibility in terms of contribution to the environmental problem, and different capabilities in terms of capacities/resources to address the environmental problem. However, critics complain that current capabilities (e.g., of rising economic powers such as China or India, two of the most outspoken proponents of the principle) are seemingly ignored, and it has become a principle that serves to differentiate between countries historically labelled "developing" vs. "developed" countries. There is ample room for interpretation as to what responsibilities and capabilities mean with regard to chemicals (and polymers) of concern.
[hazardous] [that may present a demonstrated risk of concern to human health or the environment]	These formulations differentiate between what is termed a "hazard-based approach" and a "risk-based approach". The hazard-based approach focuses on the intrinsic properties of a chemical that could potentially cause harm, irrespective of the level of exposure. It, thus, follows the precautionary principle, which encourages action to prevent harm even in the face of scientific uncertainty about exposure levels. The risk-based approach, on the other hand, considers both the hazard posed by a chemical and the likelihood of exposure to that chemical. It assesses the actual risk posed by a chemical under specific conditions of use, including how much, how often, and under what circumstances people or the environment are exposed. It often works with threshold levels, below which exposure to a certain chemical can be considered risk-free. Compared to the hazard-based approach, the risk-based approach requires more extensive research and time efforts, which—in light of missing knowledge and information regarding the chemicals and quantities used in plastics, lack of resources and the sheer number of chemicals in plastics—would potentially allow the use of hazardous chemicals, and related exposure, for a much longer time than under a hazard-based approach.
[at any stage of] [throughout] the lifecycle	Refers to the lifecycle approach in managing chemicals, considering impacts from production to disposal. While both phrases deal with the lifecycle of products or chemicals, "[at any stage of]" allows for targeted regulations at specific lifecycle stages (e.g. only at the production or only at the disposal stage), whereas "[throughout]" ensures an all-encompassing, continuous scrutiny or compliance across all stages (e.g. meeting safety standards at all stages of the lifecycle).

[and group of chemicals]	Refers to the question whether to regulate through a chemical-by-chemical approach or by grouping chemicals according to their (hazard) properties. Proponents of the latter argue that a group approach would prevent regrettable substitutions of one hazardous chemical by another. One famous example of such a regrettable substitution was the market-introduction of alternative bisphenols that followed the categorisation of bisphenol-A (BPA) as a “substance of very high concern” by the European Chemicals Agency (ECHA).
[listed in part II of annex A] [based on the criteria contained in annex A]	These formulations point to specific listings in an annex to the Global Plastics Treaty, which contains detailed information or categorisations relevant to its regulations. The difference is that annex A could either **list certain (groups of) chemicals** (potentially with respective timelines for their use or phase-out), or merely **list certain criteria** that should be employed when decisions on specific (groups of) chemicals are being made. Listing criteria for the identification of chemicals of concern (such as their carcinogenic properties, their potential for endocrine disruption, their persistence or bioaccumulation), would have the benefit of leaving room for the inclusion of further (groups of) chemicals of concern in the future, when more knowledge is generated about the effects of those chemicals of which we have very limited or no hazard data at this point. At the same time, however, only including criteria would potentially delay actions on those (groups of) chemicals of concern for which there is sufficient hazard data to warrant immediate action. Listing these (groups of) chemicals would in that case be the more ambitious option. There is of course also the option of annex A listing criteria, as well as (groups of) chemicals of concern. The current draft proposal for the annex does indeed suggest the listing of (Part A) criteria for identifying chemicals of concern, (Part B) specific chemicals in plastics for ban or elimination under the instrument, and (Part C) groups of chemicals in plastics to avoid and minimise under the instrument.

Source: Authors’ work

6. Relevance for the SWITCH-Asia region

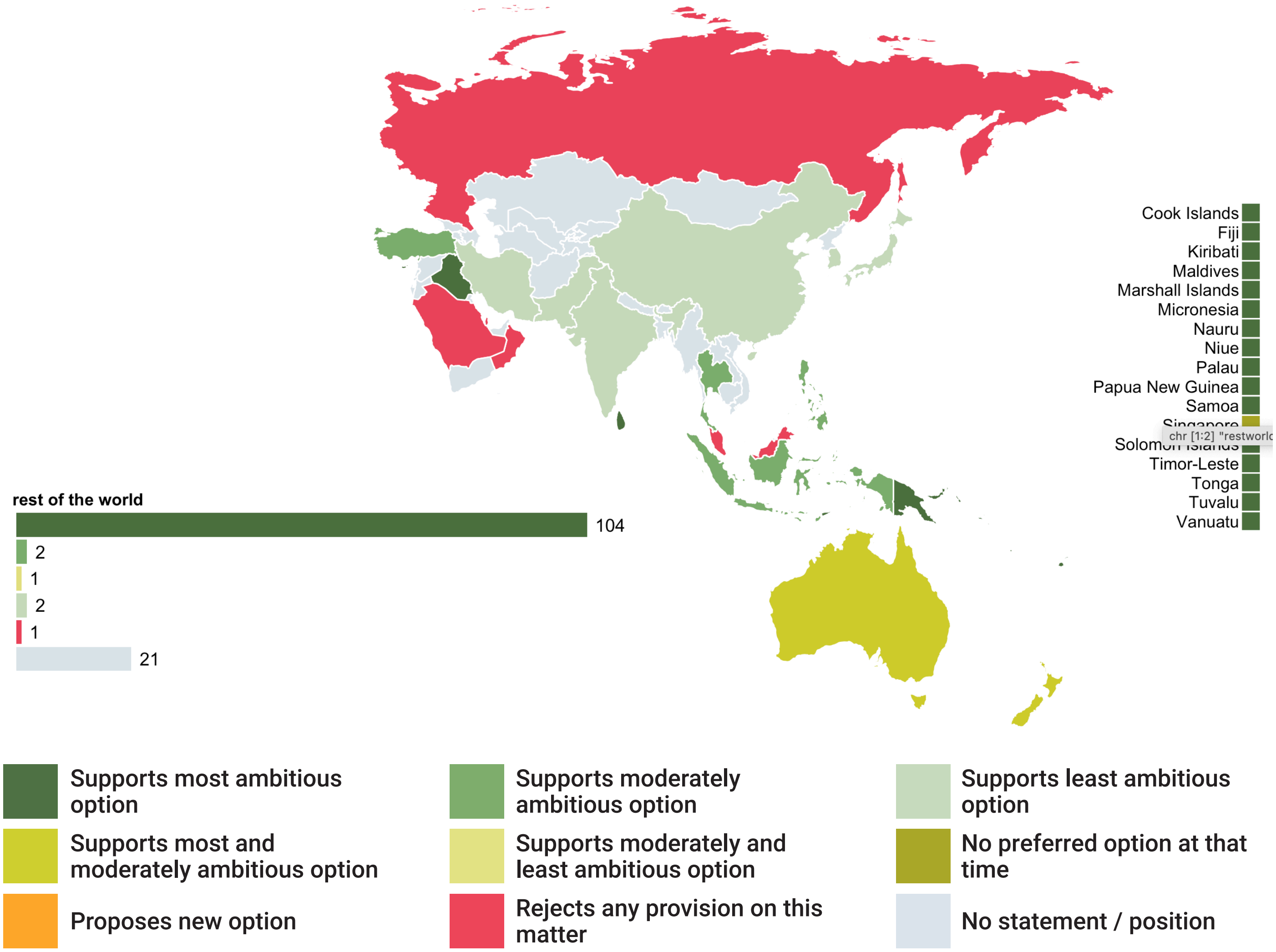


Figure 3: Asian and Pacific regions' country positions on chemicals and polymers of concern ahead of INC-3

Source: SWITCH-Asia, 2024

The Asian and Pacific Regions, including the SWITCH-Asia target countries, are in many aspects a very diverse set of countries, which also reflects on the countries' positions regarding the majority of treaty provisions. The provision on chemicals and polymers of concern is no exception. While at INC-3, countries were voicing preferences on the three options described above (as well as on preferences to delete the entire provision or to propose alternative options), the on-text negotiations at INC-4 have made it less feasible to categorise countries' positions into proponents of more or less ambitious options. However, from the analysis and categorisation of countries' positions that were conducted at INC-3 and published thereafter (see Busch, 2024), some conclusions can still be drawn.

1) Bahrain, Cuba, Russia, Saudi Arabia, Oman, Qatar, and Malaysia rejected any provision on chemicals and polymers of concern. This relates to the insertion of: [no provision].

2) Iraq, Sri Lanka, Papua New Guinea as well as the Pacific Small Island Developing States (SIDS) supported the most ambitious option. This likely relates to the insertion of: [each party]; [shall]; [and polymers]; [in [plastics and] plastic products]; [to prohibit or] to regulate; [hazardous]; [throughout] the lifecycle; [and group of chemicals]; [listed in part II of annex A], among others.
3) Iran, Pakistan, India, China, and Japan supported the least ambitious options, which would likely relate to the insertion of: [Parties]; [is encouraged]; [in plastic products]; to regulate, [as appropriate]; [taking into account common but differentiated responsibilities and respective capabilities]; [at any stage of] the lifecycle; [based on the criteria contained in annex A], among others.
4) 26 countries had not voiced any preferences prior to or during INC-3, which might indicate that they do not yet have a profound position on the issue, or that they do not render the provision relevant to their national circumstances.

There is a strong case for regulating the use and application of plastic chemicals, particularly with a view to transitioning towards a circular economy. As this Policy Brief has shown, all countries will be affected by a regulation (or lack thereof) of chemicals and polymers of concern under the Global Plastics Treaty. The specific form this may take (regulating via a whitelist of safe chemicals, a red-list of most hazardous chemicals, via groups of chemicals or a chemical-by-chemical approach, or merely by identifying criteria for further action to be prompted; see Wagner et al., 2024) is open for debate. However, especially considering the intersessional ad-hoc expert group meeting from 24 - 28 August 2024 in Bangkok, Thailand, countries in the SWITCH Asia region would benefit from taking a position on the level of ambition the provision on chemicals (and polymers) of concern should take.

7. Key messages and Concluding remarks

This Policy Brief underscores five critical messages regarding the challenges and pressing need to tackle hazardous chemicals in plastics. These messages are particularly relevant for global environmental governance and regional economic transitions.

1. **Chemicals in plastics is a serious problem:** Plastics impact human health and the environment throughout the lifecycle of plastic products, including during use and at the waste stage. Many plastic chemicals are considered hazardous. Most chemicals in plastics lack safety data, leading to unsafe products on the market, and rendering risk assessments and safe handling practices challenging.
2. **Chemicals of concern within plastics hinder the transition towards a circular economy with limited plastics burden:** The reusability and recyclability of plastics products is severely compromised by using harmful chemicals. Issues such as lack of transparency, chemical mixing, accumulation, and damage to recycling infrastructure are key challenges.
3. **Existing agreements are insufficient:** Current Multilateral Environmental Agreements do not adequately cover the wide range of hazardous chemicals found in plastics, leaving many substances unregulated on an international level. This underscores the necessity for enhanced global cooperation.
4. **INC negotiations need to come a long way:** At the negotiations for the Global Plastics Treaty, countries do not agree on how to regulate chemicals and polymers of concern at a global level. Several legal and regulatory options are under consideration.
5. **The issue is highly relevant for the Asian and Pacific regions:** Regulation of these chemicals is a prerequisite for enabling circular economy, especially in contexts where monitoring and recycling systems are under development. The stance of countries from Asia and the Pacific at the INC will influence regulations concerning chemicals and polymers of concern for decades to come.

In conclusion, current practices and regulations allow too many hazardous chemicals and polymers in products, with negative health effects for workers, consumers, waste pickers, wildlife, and the environment. The longer these practices continue, the greater the negative impacts will become, particularly when they involve persistent, bio-accumulative substances. Without swift actions being taken to curb proliferation of hazardous chemicals, efforts towards a circular economy (in particular, through recycling) will amplify the problem by transferring hazardous substances into recycled materials.

Moving towards a circular economy will be a key ingredient to tackle the triple planetary crises (climate change, biodiversity loss and pollution), and thus serves the purposes of most MEAs. There is, thus, an urgent need for comprehensive and robust regulations to manage chemicals and polymers of concern in plastics.

Hence, as negotiations continue for the Global Plastics Treaty, the complexities and the critical environmental and health impacts of chemicals and polymers of concern must be understood and addressed, also to signal to businesses that their current practices will no longer be allowed and must be changed in order to comply with new regulations. Global cooperation and stringent measures in this regard are key to transitioning towards a circular economy where the health impact and environmental burden of plastics are limited. The insights provided by this Policy Brief emphasise the necessity for a unified approach to ensure sustainable management of plastics and safeguard environmental and public health on a global scale.

References

Busch, P.O. & Schulte, M.L. 2024. Reflections on INC-4: Minor triumphs with substantial work ahead. Accessed 31 May 2024.

CIRS. 2024. EU Proposed a Ban on the Use of BPA in FCMs. https://www.cirs-group.com/en/food/eu-proposed-a-ban-on-the-use-of-bpa-in-fcms. Accessed 24 June 2024.

Reininger, N. & Oehlmann, J. 2024. Regrettable Substitution? Comparative study of the effect profile of bisphenol A and eleven analogues in an in vitro test battery. *Environmental Sciences Europe,* **36**, 76. https://doi.org/10.1186/s12302-024-00900-1

SWITCH-Asia. 2024. Positions of Asia-Pacific Countries on the Global Plastics Treaty. Accessed 1 June 2024.

United Nations Environment Programme (UNEP). 2024. Zero draft text of the international legally binding instrument on plastic pollution, including in the marine environment.

UNEP. 2023. Report of the intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, including in the marine environment, on the work of its second session. UNEP/PP/INC.2/5

UNEP and Secretariat of the Basel, Rotterdam and Stockholm Conventions (BRS Secretariat). 2023. Chemicals in Plastics: A technical report. Geneva.

Wagner, M., Monclús, L., Arp, H.P., Groh, K., Løseth, M., Muncke, J., Wang, Z., Wolf, R. &

Zimmermann, L. 2024. State of the Science on Plastic Chemicals. Identifying and addressing chemicals and polymers of concern. http://dx.doi.org/10.5281/zenodo.10701706. https://plastchem-project.org/

Weis, J.S., Alava, J.J. 2023. (Micro)Plastics Are Toxic Pollutants. Toxics. 11:11. https://doi.org/10.3390/toxics11110935

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