Identifying risks posed by new materials early on: kick-off meeting of an interagency working group “Advanced Materials”

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Printable components, lightweight elements for cars or nano-carrier systems in cosmetics and food – in materials research, these innovative functional materials are known as “advanced materials” (AMs). They have special properties at atomic or molecular level and great application potential in the domains of science, technology and medicine. The term covers, for example, nanomaterials with special electrical or optical properties or biomaterials that can be used in cell culture or drug delivery. This differentiates AMs from “conventional materials”, such as metal, concrete and plastic.

AM development is funded as part of the European Union’s Horizon 2020 research programme and the Federal Ministry of Education and Research (BMBF)’s material umbrella strategy. These functional materials are considered a key technology to guarantee the European, and, consequently, also the German industry, a leading role in global competition and to contribute to increasing growth in Europe. With this in mind, possible health and environmental risks that may emanate from these new materials should also be identified early on. Therefore, an interagency working group “Advanced Materials”, which is being chaired by the German Federal Institute for Risk Assessment (BfR), was established. It aims to elucidate how to approach this diverse and unclear class of materials from the perspectives of health risk assessment, early risk detection and regulation. The kick-off meeting with participants from ministries, authorities and research institutes took place digitally on November 4 and 5 2020.

The working group aims to gain an overview of AMs, examine different areas of application and develop classification concepts. At the same time, early risk detection is also being looked at. The fundamental approach is not to consider all AMs as a whole, but rather to identify individual materials with a particular concern based on scientific criteria. In order to achieve this, the working group will also develop criteria for early risk detection. These criteria will support risk management and inform political decision-makers with regard to making necessary adjustments, for example, for regulation.

“Advanced materials” (AMs) are considered a key technology around the world, which is also reflected in the increasing research in this field.

The European Commission assumes that developing AMs could help to transform the EU economy into a climate-neutral one. One of the first EU activities was the DAMADEI report published on this topic in 2013. DAMADEI stands for Design and Advanced Materials as a driver of European Innovation. Among other things, the report states: “We are entering a new era where products …are going to be shaped by invisible forces, complex science and new manufacturing methods. …This is not just space age stories but real down to earth applications in everyday life - a vehicle to the moon, to the tools for brain surgeries, to the food we eat are all products of advanced materials and processes.”

The Federal Government has also positioned itself towards AMs in its high-tech strategy. In its discussion paper on material research, the Federal Ministry of Education and Research (BMBF) has specified the German position. It is expected that materials science will provide technical solutions for important global challenges, including those involving climate, medicine and energy.

At the same time, questions arise regarding the safety of innovative materials for the environment and humans. The German interagency working group “Advanced Materials” has been set up to detect risks that could emanate from AMs early on and to be able to derive regulatory measures.

Interagency working group “Advanced Materials”

On November 4 and 5 2020, the German Federal Institute for Risk Assessment (BfR) invited to a kick-off meeting to establish an interagency working group “Advanced Materials”, which is being chaired by the BfR.

The following ministries, authorities and institutions participated:

The Federal Ministry for the Environment Environment, Nature Conservation and Nuclear Safety (BMU), the Federal Ministry for Economic Affairs and Energy (BMWi) as well as the Federal Institute for Occupational Safety and Health (BAuA), the Federal Environment Agency (UBA), the Federal Institute for Materials Research and Testing (BAM), the National Metrology Institute of Germany (PTB), the Federal Institute for Drugs and Medical Devices (BfArM), the Federal Office of Consumer Protection and Food Safety (BVL), the Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA) and the Institute for Prevention and Occupational Medicine of the German Social Accident Insurance (IPA).

The working group is also supported by the Federal Ministry of Food and Agriculture (BMEL), the Federal Ministry of Health (BMG), the Federal Ministry of Labour and Social Affairs (BMAS), the Federal Ministry of Defence (BMVg) and the Federal Ministry of Education and Research (BMBF).

The working group’s first steps

The kick-off meeting focused on a common understanding and getting an overview on the very large area of “Advanced Materials”. Participants discussed about a practicable working definition, to identify which materials are AMs and should therefore be considered. Possible classification concepts were also discussed.

Many AMs are already on the market, meaning they are already used in products; others are in advanced development. Examples are printable electronic components; lightweight elements for aircraft or vehicle construction; nano-carrier systems in medicine or as a component of cosmetics and food. They are also used in plant protection products and biocides. Other examples of AMs are active and intelligent polymers for packaging or functional textiles. Materials that have been produced using advanced manufacturing methods, such as 3D printing processes, are also considered to be advanced materials.

The working group plans to sort through this enormous and unclear AM application area to develop, coordinate and apply sensible classification approaches on this basis.

Working group’s biggest challenge is to “filter out” those materials from many different ones for which there is a justified concern regarding their impact on the environment or health. These must then be examined to determine the extent to which existing legal measures are effective and, if necessary, identify gaps and draw up options for action. The working group

wants to develop future-orientated concepts for screening AMs, early risk detection and generally handling AMs. Early coordination across authorities and ministries considering different target populations is at the centre of the new “Advanced Materials” working group.

An overview of all of the BfR’s opinions and communications on the BfR’s website is also provided by the BfR Opinions app

BfR ‘Opinions app’

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany. The BfR advises the Federal Government and the States (“Laender”) on questions of food, chemical and product safety. The BfR conducts its own research on topics that are closely linked to its assessment tasks.