Silver *(Ag)*

Figure 1: © Image by Steve Buissinne from Pixabay.

1. What is Silver?

Silver is a chemical element from the group of so-called transition metals. It is a soft noble metal that has excellent electrical and thermal conductivity. Silver reacts with hydrogen sulphide, which is present in traces in the air, to form silver sulphide. For this reason, silver tarnishes black after some time.

In nature, silver occurs in form of ores from which it is then extracted industrially by chemical processes. In addition to silver ores, silver is often contained in small amounts in copper and lead ores. [1]

2. (Commercial) Use of the Material and its Applications

Due to its special physical, chemical and biological properties, silver is used in many different areas.

As a result of its outstanding electrical and thermal conductivity, silver is an important material in electronics, electrical engineering and soldering technology.

The optical properties of silver are also eminent compared to other metals. Due to its strong light reflection, silver has a special metallic shine. This is used, for example, to produce high-quality mirrors or silver plating of Christmas tree balls.

Nanoparticular silver can also be used in a wide range of applications. Mostly its biological, antibacterial property is used for this purpose. The silver coating of surfaces in refrigerators, on handles, in medical ceramics or plastics, endoscopic devices and much more ensures that germs are killed and thus provides the correspondingly desired hygiene. Silver nanoparticles can also be incorporated into materials such as medical wound pads, disinfectant creams or textiles to combat bacteria or act as odour inhibitors.

Beyond that, nanosilver is also partly used as a coating for solar cells.

3. How can I come into contact with this material?

Whether in the form of jewellery or old cutlery, mirrors, electronic components or wall paints, silver is a constant companion in our everyday life. Especially in the medical field, silver is used as

described above to inhibit the growth of bacteria. The silver particles used in such wound dressings or creams can leave materials and thus enter the skin.

The wearing of silver jewellery is harmless for healthy skin, as the skin has a natural protective function.

Silver is also approved as a food colouring with its identification number E174 and can therefore also be ingested with food.

4. Relevance for risk governance

Due to the lack of scientifically proven studies on the effects of nanosilver, it is not possible to make a general statement about the risks of silver nanoparticles. Nanoparticulate silver is often used in consumer products and can also be released from the materials depending on the application. The use of silver particles in the medical sector has also raised the question of whether this may also have an effect on the propagation of antimicrobial resistances.

In summer 2014, the European Commission and its non-food Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) published a final opinion on the safety, health and environmental impact as well as the role in antimicrobial resistance of nanosilver. It was stated that further studies and research are needed to fill the existing knowledge gap in the coming years.[2,3]

5. References

[1] https://www.nanopartikel.info/en/nanoinfo/materials/silver/overview

[2]https://ec.europa.eu/health/sites/health/files/scientific_committees/emerging/docs/scenihr_o_039.pdf

[3]https://ec.europa.eu/health/sites/health/files/scientific_committees/docs/citizens_silvernanoparticles_en.pdf