The impact of the proposed classification of Titanium Dioxide on the primary aluminium industry

Position Paper

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EUROPEAN ALUMINIUM

The issue

The European Commission has proposed to include Titanium Dioxide (TiO_2 in the following) in the 14th Adaptation to Technical Progress (ATP) to the EU Regulation 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulation), and the final vote in the REACH Committee is expected in February 2019.

Based on the text submitted by the EU Commission to the WTO in December 2018, the proposal is as follows:

Index No	Chemical Name	EC No	CAS No	Classification		Labelling			Specific Conc. Limits, M-factors and ATEs	Notes
				Hazard Class and Category Code(s)	Hazard statement Code(s)	Pictogram, Signal Word Code(s)	Hazard statement Code(s)	Suppl. Hazard statement Code(s)		
'022-006-002	titanium dioxide; [in a powder form containing 1% or more of particles with diameter ≤ 10 µm]	236-675-5	13463-67-7	Carc. 2	H351 (inhalation)	GHS08 Wng	H351 (inhalation)			V, 10

Where "Note 10" reads:

"The classification as a carcinogen by inhalation applies only to mixtures placed on the market in powder form containing 1% or more of titanium dioxide particles with diameter ≤ 10 µm";

The impact on the primary aluminium industry

TiO_2 is naturally present in bauxite, the ore at the origin of the primary aluminium production, in concentrations which would **not** meet the classification criteria, i.e. 1% or more of particles with diameter ≤ 10 µm.

However, during the refining of bauxite to obtain alumina (i.e. aluminium oxide), which is the raw material for aluminium, a residue called "bauxite residue" is generated (also known as "red mud"). Based on the current production of alumina in Europe, **the yearly generation of bauxite residue amounts to about 7 million tonnes**, with additional existing storage areas over 250 million tonnes across Europe.

The bauxite residue storage areas are handled according to the Best Available Techniques, indicated both in the Non Ferrous Metals BREF [1], in the BREF for the Management of Waste from Extractive Industries and in the guidelines developed by the industry at global level "Bauxite Residue Management Guidelines".

Furthermore, the aluminium industry is putting significant efforts in place towards recycling bauxite residue in other sectors or into products for various applications. In 2018, one European alumina refinery has achieved to recycle more than 15% (110,000 t) of its annual bauxite residue production in cement plants. Numerous research projects and patents are focusing on turning bauxite residues into resources for the cement, construction or steel sectors as well as well as innovative added value products. One such project, is the ongoing H2020 *RemovAL project n°776469,* www.removal-project.com), worth over 11 M€, in which the majority of European alumina refineries are participating.

[1] COMMISSION IMPLEMENTING DECISION (EU) 2016/1032 of 13 June 2016 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the non-ferrous metals industries

Based on the available information, it is possible that **the concentrations of TiO_2 in the bauxite residue would meet the proposed classification criteria**. This would cause the entire mixture to be classified as a carcinogen, de facto canceling the BAT for its handling and storage in dry form and heavily impacting the possibilities for recycling and the related market opportunities for this material.

This would go against the principles of circular economy and waste hierarchy and would perpetuate the above-ground storage of bauxite residue. It is important to note that scientific evidence shows that:

1. bauxite residue is naturally agglomerated. In fact, the bauxite residue, following BAT handling, is normally not in a "powder form" but rather a "paste form", i.e. with a moisture content that makes it not inhalable
2. TiO_2 is not 'free' in the bauxite residue, but rather part of its complex mineral matrix, as during the alumina production process, TiO_2 reacts with the other metals forming complex oxidic compounds.[2]

The way forward

The aluminium industry intends to continue its research towards viable recycling opportunities for bauxite residue, and in order to avoid harming these efforts, we would suggest to explicitly indicate in the note to the classification that it would not apply to the mixtures in paste form (as produced by BAT handling of bauxite residue) as they are not compatible with the inhalation route nor to mixtures where TiO_2 is found in complex mineral forms.

[2] Peter Smith, J. Hydrometallurgy 170, DOI: 10.1016/j.hydromet.2016.02.011 (2016); Johannes Vind et al., Minerals 8(2):77 DOI: 10.3390/min8020077 (2018); Platon Gamaletsos et al., Scientific Reports 6(21737):1-12, DOI: 10.1038/srep21737 (2016)