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### **Potential valorizations of artificial gypsum generated in the manufacture of titanium dioxide pigments**

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In the southwest of Spain, is located an industry engaged in the production of titanium dioxide, a pigment that delivers whiteness, brightness and opacity to a vast range of products from coatings and polymers to cosmetics and food. The industry generates a waste with high content of Ca called red gypsum (RG) due to its high level of iron and another one from the unattacked mineral (ilmenite) called also tioxide by the industry. In the same way, it releases large amount of CO<sub>2</sub> into the atmosphere due to the final calcination done the TiO<sub>2</sub> pulp to convert it to pigment in the anatase form. Currently these wastes have no commercial value and therefore they are disposed of in an authorized and controlled repository area generating this management a high cost to the company and a future impact to the environment. Considering the above problems, the main objective established for this work was valorizing these inorganic wastes through commercial applications by two different ways. Firstly, as a potential building material to manufacture fire-resistant panels and secondly as a source of calcium for CO<sub>2</sub> sequestration by an indirect carbonation process. In order to develop these purposes and assess the correct technical behavior and the environmental impact, the waste and materials obtained from them underwent to an exhaustive physicochemical characterization by XRF, ICP-MS, XRD, TGA, SEM, Fire-resistance tests and finally the natural radionuclides were measured by alpha-particle spectrometry due to this activity is a NORM industry (NORM=Naturally Occurring Radioactive Material). The most relevant results have demonstrated that red gypsum could be used to build fire-resistant panels, since it do not undergo significant chemical and structural changes up to about 1000°C. Furthermore, RG has high carbonation efficiency (92%), when sodium hydroxide is used as extraction agent making it an excellent sequestration agent of CO<sub>2</sub> that could contribute to reduce the CO<sub>2</sub> released by industries into the atmosphere.

#### **Biography**

S M Perez-Moreno is a PhD student whose line of research is science and environmental technology and it is geared to the valorization of industrial inorganic waste. She belongs to the Research Group FRYMA (Physics of radiation and Environment), Department of Applied Physics of the University of Huelva. During two years of her research career, she has published two papers in international journals (Web of Science of Thomson Reuters) derived from the work done on characterization and valorization of red gypsum. She has participated in 3 international conferences with an oral presentation and two posters.

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