

GEOPOLYMERS FOR HAZARDOUS CATIONS AND ANIONS INERTIZATION

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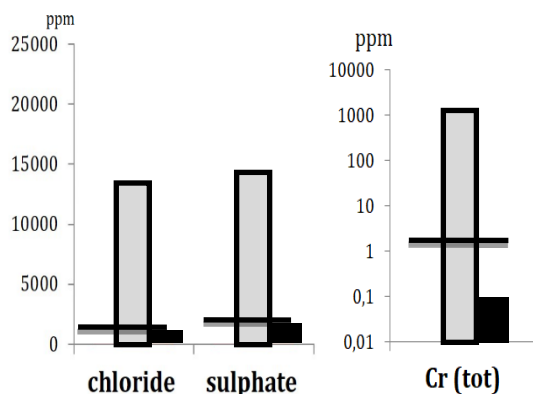
Several waste liquors are classified as toxic or hazardous waste and represent a real burden for companies in terms of costs and treatment time. One of the most difficult to treat is the tannery waste water that represent a high pollution risk if not treated and collected properly.

Geopolymeric matrix based on metakaolin has been used to treat tannery waste water without any post use treatment. The as received waste water containing tannins, chromium soluble salts, phenols, bicarbonates, and a mixture of organic compounds have been added to a geopolymeric formulation which was optimized for Cr^{+3} liquor [1].

The addition of toxic water was added with weight ratio 40:100 to metakaolin powder. The final geopolymer structural integrity was test after 24h and 72h in water. Four week after the synthesis of the geopolymer, the waste-leaching-compliance test was performed according to the European norm EN 12457: the dry sample was washed and weighed, the granular material was poured into bi-distilled water in a flask, with solid/liquid ratio 1/10; the heterogeneous liquid/solid mixture is left to stir for 24h, and, finally, the solid was filtered and the solution analysed via ICP-AES.

The ions released from the material were below the limit fixed by Italian regulation DLGS 152/2006, in the case of chloride (limit 1200 ppm), sulphate (limit 1000 ppm) and total chromium content (limit 2 ppm) see Figure 1. The test indicated that geopolymerization is an efficient and a low cost inertization technique when compared to actual treatment technologies available in the industry.

We are completing the mechanical properties tests, but we can already suggest that the final geopolymeric material can be used as building materials for floorings and non-structural applications.



[1] L. Barbieri, E. Kamseu, I. Lancellotti, C. Leonelli, C. Ponzoni, Procedure for the inertization of liquid waste IT 0001410758, 19 Sept. 2014.

Figure 1 – Content of Cl⁻, SO₄²⁻ and Cr in the leachate before (grey bar) and after geopolymerization (black bar); curing time 28 days.