

Malferrari D., Laurora A., Elmi C., Brigatti M.F., Medici L., Zeqireja M.C. (2012) Channel sediment characterization and evaluation of the potential impact of iron-rich phases on the use of sediments in brick production. *Environmental Engineering Science*, 29(9), 840-847. DOI:10.1089/ees.2010.0060.

ABSTRACT

This paper aims to study the mineralogy and the Fe coordination shell in contaminated sediments from drainage and irrigation canals, comparing data collected at room and high temperatures. A new approach lessening the environmental impact is to use these sediments in the production of bricks; however Fe oxidation state and multifarious Fe structural location in minerals frame affect some important features of the final industrial products. Sediments came from irrigation and drainage canals of Po river region in the north-eastern of Italy. Samples were investigated via X-ray powder diffraction under ambient and *in-situ* non-ambient conditions (XRPD), thermal analysis (TGA) and X-ray absorption spectroscopy (XAS). Structural details on sediments were inferred comparing experimental XAS measurements with literature data. Thanks to this multi-analytical approach, it was demonstrated that Fe in sediments is mostly bonded to smectite and illite thus driving to the definition of appropriate recycling and exploitation process via thermal inertization.

Keywords: Canals, Fe k-edge XAS, sediments, thermal analyses, XRPD