

## REPORT

**Proposal Code** EV-487

**Proposal Title** Nano-hematite as a mean for reduction of heavy metal concentration in AMD (acidic mine drainage) materials: structural characterisation with total scattering

**Local contact** Giorgia Confalonieri

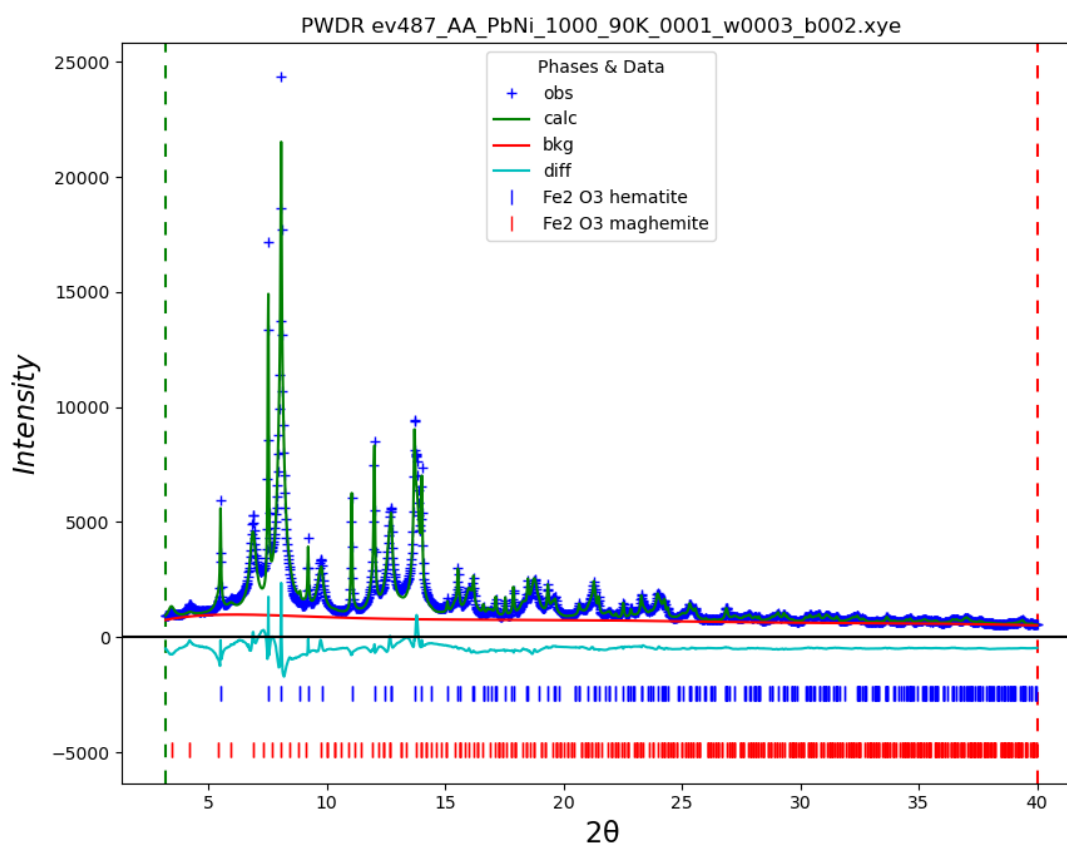
**Experimental team** Monica Dapiaggi, Nicola Rotiroti, Matteo Beretta, Andrea Zanoni

**Experiment dates** 21/02/2023-25/02/2023

It was the first time for us with the new detectors for the high resolution setup at ID22. We are deeply impressed by the quality of the data and, most of all, by the speed in data collection. An excellent PDF on disordered materials can be collected in about 70-75 minutes, against the about 3 hours with the previous detector set.

The experiment is very recent, so most of the data analysis is still to be done. Some of the data, however, are already on Matteo Beretta's graduate thesis. He is going to graduate in April 2023, so he only used the data for some meaningful Rietveld refinements.

The one in figure is a good example.



The sample comes from Pb adsorption (a solution with 1000 mg/L of lead nitrate) over an amorphous precursor obtained with a sol-gel synthesis. The precursor + Pb was then crystallised at 200 °C, resulting in a mixture of hematite ( $\alpha\text{-Fe}_2\text{O}_3$ ) and maghemite ( $\gamma\text{-Fe}_2\text{O}_3$ ). Previous TEM observations on the same sample showed lead only in maghemite and not in hematite.