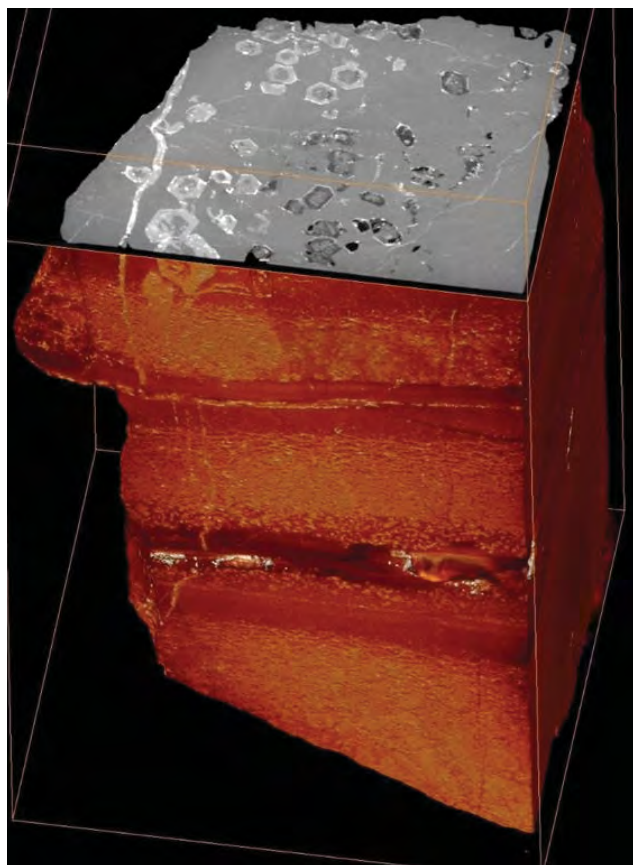


**MS15-P07****Investigating the primitive Earth through crystals**Fermin Otalora<sup>1</sup>, Juan Manuel García Ruiz<sup>1</sup><sup>1</sup>. Laboratorio de Estudios Cristalográficos. Instituto Andaluz de Ciencias de la Tierra. CSIC/UGr, Armilla, Granada, Spain**email: ferminotalora@gmail.com**

Crystallography has a long history in providing knowledge and methods for applications in other disciplines. The identification of minerals using X-ray diffraction is one of the most important contributions of crystallography to Earth Sciences. But crystals deteriorate during the long geological history, getting dissolved, replaced or deeply modified. After these process, diffraction information is restricted or Inexistent. This happen specially for crystals in very old samples, like the Archean rocks (3500 My) that we have investigated. In these cases, the real crystals disapeared long time ago and the morphology of the crystal casts provides the only crystallographic information on the original mineral phase and the environment of crystal growth. Here, we investigate crystal pseudomorphs and crystal casts found in a carbonate-chert facies from the 3.48 Ga old Dresser Formation (Pilbara Craton, Australia) that host some of the oldest remnants of life. Any information obtained from these casts on the atmosfere or the sea were crystals grew is telling us about the environment where life started. We have used a combination of X-ray microtomography, energy-dispersive X-ray spectroscopy, and crystallographic methods to reveal the original phases of these Archean pseudomorphs. We found with a high degree of confidence that the original crystals forming in Archean times were hollow aragonite.

**Keywords: Aragonite, crystal morphology, X-ray tomography****MS15-P08****Crystal growth of lead bearing phases at acidic conditions**Ana Roza Llera<sup>1</sup>, Amalia Jiménez<sup>1</sup>, Ester Benito<sup>1</sup><sup>1</sup>. Department of Geology. University of Oviedo., Oviedo, Spain**email: ana.roza@gmail.com**

Dissolution - crystallization reactions can control the up-take of heavy metal such as lead, which is harmful to human health if inhaled or ingested. When Pb-bearing aqueous solution interacts with carbonates and sulfates, the formation of secondary phases at the interface mineral-water plays an important role on both the migration and accumulation of this pollutant in earth surface systems. The interaction of lead dissolved with calcium bearing minerals has been previously studied at pH between 4.75 and 6.8 [1-2]. However, less attention has been paid to the crystallization of Pb-bearing minerals in high acidic environments, in which the availability and mobility of dissolved Pb increase. Here, we have studied the interaction of Pb dissolved with both calcite and gypsum at highly acidic and atmospheric conditions. The main goals of this work were (a) to analyse the physicochemical evolution of the system and (b) to study the nature and morphology of the neo-formed phases. With these aims, a set of macroscopic experiments has been carried out by placing 1 g of crystals of a mix of calcite and gypsum (3.0 – 4.0 mm) in batch reactors containing 100 mL of Pb-bearing aqueous solution at pH= 2.5. Then, the vessels were closed with parafilm to minimize evaporation during reaction times (from 1 hour to 48 hours). The parent solution was prepared using reagent-grade Pb(NO<sub>3</sub>)<sub>2</sub> and high-purity deionized water to yield [Pb<sub>aq</sub>]<sub>initial</sub> of 500 mg/L. After given period of time, the solid phases were analysed by glancing incident X-ray diffraction (GIXRD), Raman spectroscopy (RS) and Scanning Electron Microscopy (SEM). The initial and final pH were monitored and Ca<sup>2+</sup> and Pb<sup>2+</sup> in the aqueous solutions were analysed by ICP-OES.

Results show that dissolution of calcite and gypsum is simultaneous to elimination of the almost Pb<sup>2+</sup>. Anglesite (PbSO<sub>4</sub>) were identified using RS and GIRDIX in all interaction experiments with gypsum. SEM reveals the heterogeneous nucleation of anglesite crystals, which are distributed randomly without covering all the gypsum surface. Different morphologies of anglesite are identified, including small rhombus-shaped single crystals, aggregates of identical crystals growing in parallel and contact twins. On the contrary, calcite is dissolving during the entire period of reaction and lead-bearing carbonates are not detected on the calcite surfaces. These data show that anglesite is a stable phase responsible of the Pb elimination under acidic conditions. The evolution of the anglesite morphologies after given reaction periods are discussed.

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**Keywords: Lead, Calcite, Gypsum**