

## Macroscopic and microscopic dissolution behavior of $\text{FeCO}_3$ in the presence of chromium

YUANZHI TANG<sup>1\*</sup> AND SCOT T. MARTIN<sup>1,2</sup>

<sup>1</sup>School of Engineering and Applied Sciences  
(\*correspondence: ytang@seas.harvard.edu,  
scot\_martin@harvard.edu)

<sup>2</sup>Department of Earth and Planetary Sciences, Harvard  
University, Cambridge, MA 02138, USA

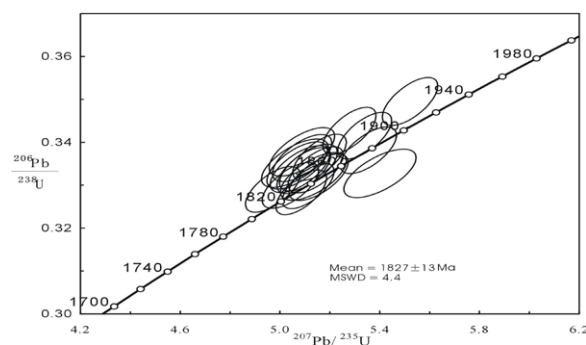
Siderite ( $\text{FeCO}_3$ ) is an important reduced phase iron mineral and end product of bacteria anaerobic respiration. This study addresses its dissolution in the presence of chromate, a common environmental contaminant and oxidant. Experiments by *in situ* atomic force microscopy show that macroscopic dissolution rate at  $\text{pH} < 4$  is lower than that in the control solution or  $\text{O}_2$ . Isolated dissolution pits and widespread surface etching occur and do so simultaneously with surface precipitation. For  $4 < \text{pH} < 10$ , slowest dissolution rate and fast precipitation at both edge steps and terraces are observed. For  $\text{pH} > 10$ , the dissolution rate is high and similar to that of the  $\text{O}_2$  system, likely due to electron transfer facilitated by  $[\text{Fe}^{3+}(\text{OH})_4]^-$ . Dissolution and re-precipitation of round hillocks are observed. X-ray photoelectron spectroscopy results show the presence of Cr (III) and the reaction products as an oxyhydroxide, suggesting the formation of low solubility Cr (III)-Fe (III)-oxyhydroxide.

## A LA-ICP-MS chronological study of amphibolite at the south margin of Altyn Tagh and its geological implication

TANG ZHUO, SUN JIMING, MA ZHONGPING  
AND LI XIANGMIN

Xi'an Center of Geological Survey (Xi'an Institute of Geology and Mineral Resource), CGS, Xi'an, Shaanxi 710054, China (156154213@qq.com)

The Altyn Tagh Groups is the oldest metamorphosed stratum in Altyn Tagh area. Because of lack of precise isotopic dating, some researchers proposed that this Groups formed in Neoproterozoic and there were not existence of Neoproterozoic to Paleoproterozoic metamorphosed basement in Altyn Tagh area. This paper provides the LA-ICP-MS zircon U-Pb isotopic dating result of the amphibolite from Altyn Tagh Groups in the south margin of Altyn Tagh and discusses its geological significance. The CL images of zircons in the amphibolite show that most of the zircons present the typical characteristics of metamorphic zircons with face shape structure and without girdle structure and core-rim structure. The LA-ICP-MS Zircon U-Pb isotopic dating show the weighted mean  $^{207}\text{Pb}/^{206}\text{Pb}$  ages of 19 zircons, which located in concordia curve, is  $1827 \pm 13\text{Ma}$  (MSWD=4.4) and suggest that the epoch of metamorphism of the amphibolite is later Paleoproterozoic. The new data of isotopic chronology indicated that there existed a tectonic-heat event which corresponds to Lüliang orogenic movement in China and maybe relate to the converging or breakup event of global Columbia supercontinent in Paleoproterozoic. The result also indicate that there are age-old Paleoproterozoic metamorphosed basement in Altyn Tagh area and provide a new data for research Precambrian tectonic-heat events and the evolution of Altyn Tagh Belt.



**Figure 1:** U-Pb concordia diagram of zircons in amphibolite from the south margin of Altyn Tagh, China

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