

# Accepted Manuscript

Research paper

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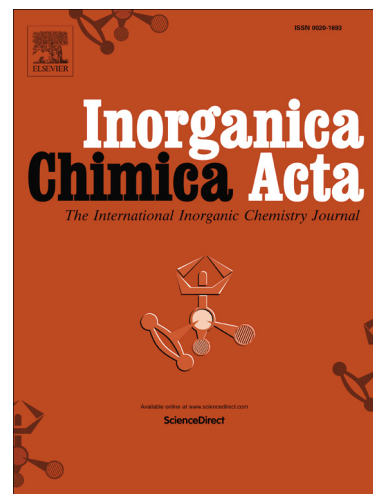
PII: S0020-1693(17)31436-6  
DOI: <https://doi.org/10.1016/j.ica.2017.10.003>  
Reference: ICA 17929

To appear in: *Inorganica Chimica Acta*

Received Date: 14 September 2017  
Revised Date: 2 October 2017  
Accepted Date: 4 October 2017

Please cite this article as: J. Zhu, C. Tang, J. Wei, Z. Li, M. Laipan, H. He, X. Liang, Q. Tao, L. Cai, Structural effects on dissolution of silica polymorphs in various solutions, *Inorganica Chimica Acta* (2017), doi: <https://doi.org/10.1016/j.ica.2017.10.003>

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# Structural effects on dissolution of silica polymorphs in various solutions

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## ABSTRACT:

The dissolution and precipitation of silica minerals in rocks, soils, and sediments are essential processes of material transformations near the Earth's surface. In this study, the dissolution of  $\alpha$ -quartz and  $\alpha$ -cristobalite are investigated at 25°C in HNO<sub>3</sub>, NaOH, KCl, and MgCl<sub>2</sub> solutions. The amounts of silicon release from  $\alpha$ -quartz in HNO<sub>3</sub> and electrolyte solutions are larger than those from  $\alpha$ -cristobalite, and the circumstance is in consistence with the density of surface silanols. In NaOH solutions, the amounts of silicon release increase significantly and the maximum amount is about 30 times higher than that in acid and electrolyte solutions. Moreover, the maximum silicon release is inversely proportional to the density of surface silanols, resulting in a lower silicon release from  $\alpha$ -quartz in comparison to that from

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