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Halogen Chemistry and Hydrogen Isotopes of Apatite from the >3.7 Ga Isua Supracrustal Belt, SW Greenland

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1 **Halogen Chemistry and Hydrogen Isotopes of Apatite from the >3.7 Ga Isua**  
2 **Supracrustal Belt, SW Greenland**

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14 **Abstract**

15 The origin and evolution of volatiles, particularly water, in the abiotic early Earth  
16 environment have been intensively studied, and this is a topic of high relevance when  
17 considering the timing and conditions of life's emergence. Investigation of hydrogen  
18 isotopes in the oldest crystals of minerals from the apatite group  $\text{Ca}_{10}(\text{PO}_4)_6(\text{F},\text{Cl},\text{OH})_2$   
19 should bring new insight to this topic as the D/H ratio of apatite has proved useful for  
20 establishing the evolution of volatiles in other solar system bodies. Apatite crystals from  
21 metasedimentary and metavolcanic rocks collected from a low-strain domain of the  
22 Eoarchean Isua supracrustal belt have been investigated for their D/H signatures using  
23 secondary ion mass spectrometry and for major and trace element abundances using

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