Organic Carbon inventory of the Tissint meteorite.

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The fall of the Tissint meteorite has provided a unique opportunity to study a minimally contaminated piece of Mars. Martian organic carbon has been detected previously in igneous basalts and the carbonates of ALH 84001. Analysis of sealed maskelynite inclusions using *in situ* techniques including Raman, NanoSIMS, ToFSIMS, STXM and TEM, coupled with whole rock analysis by stepped combustion, GCMS and evolved gas analysis has revealed an inventory of organic compounds containing –CH, -CN, -CNO, -COOH, -CO and aromatic complexes. These are spatially resolved to known inorganic catalysts, i.e. magnetite, pyrite, nickel containing pyrrhotite and clays. Furthermore there is a release of nitrogen containing organics above 600ºC, at which temperature $\delta^{15}N$ is ~ +40 ‰. These results show that Mars has an inventory of organic carbon and nitrogen containing molecules that are probably produced through abiological hydrothermal activity.

PTX properties of $FeCl_2$-bearing fluids at elevated *PT* conditions

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Iron chloride is a significant component of saline aqueous fluids in many ore-forming environments, commonly occuring at concentrations of up to several mass percent [1]. Thus the effect of $FeCl_2$ on the phase equilibria of aqueous fluids is a significant factor in interpreting fluid evolution in iron-rich systems such as tin-tungsten deposits and some porphyry copper deposits. However, there are few available experimental data on the phase equilibria and thermometric properties of iron-bearing aqueous fluids [2].

We have used the synthetic fluid inclusion technique to investigate the pressure-temperature conditions along the locus of critical points in the system H_2O-$FeCl_2$, from 0 to 35 wt% $FeCl_2$. Our results show that the effect of $FeCl_2$ on the phase equilibria of aqueous fluids is unlike that of other divalent cation chlorides such as $CaCl_2$ or $MgCl_2$. Specifically, the locus of critical points for H_2O-$FeCl_2$ fluids occurs at significantly lower pressure (at a given temperature) compared to the critical curve of the system H_2O-NaCl. For example, at 500 °C the critical point for H_2O-$FeCl_2$ fluids occurs at 480 bar, compared to about 560 bar for H_2O-NaCl. The low pressure along the H_2O-$FeCl_2$ locus of critical points implies that immiscibility (boiling) of $FeCl_2$-rich fluids can occur only at relatively low pressures, or relatively shallow levels in the crust. These results allow us to reinterpret the conditions of mineralization at boiling, Fe-rich hydrothermal systems.

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