



Cement and hydrogen production from serpentinization on Mars

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Serpentinization may provide a means to produce both cement and molecular hydrogen (H_2) on Mars. Magnesium oxide (MgO) derived from serpentinization-related brucite ($Mg(OH)_2$) and/or magnesite ($MgCO_3$) was combined with amorphous silica to produce a magnesium silicate hydrate (MSH) binder, similar to Portland Cement (PC). Concrete produced from the MSH binder achieved a compressive strength comparable to PC concrete and adequate to meet martian loading conditions. During serpentinization to produce brucite ($Mg(OH)_2$), $H_{2,gas}$ was produced at a rate capable of providing a timely source of fuel. Overall, hydrogen production would be constrained to the availability of water, the regional abundance of olivine, and the energy required for olivine processing on Mars.