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# BUILDING OUT A SELF-SUFFICIENT INDUSTRIAL ECOLOGY FROM ALUMINIUM PRODUCTION ON THE MOON

**Abstract**

We have recently demonstrated in a laboratory environment throughput from lunar highland simulant to aluminium wire feedstock for 3D printing. The implications of this are significant as they demonstrate the initial core of a lunar industrial ecology for industrialisation of the Moon. Our process began with simple magnetic beneficiation of highland simulant to concentrate the feldspar (anorthite CaAl2Si2O8) component. This was subject to two rounds of HCl reagent leaching to yield respectively CaCl2, SiO2 and Al2O3, i.e. we utilise everything and waste nothing – CaCl2is used as the electrolyte for molten salt electrolysis, SiO2 is useful as thermal insulation, refractory applications, fused silica glass and piezoelectric quartz, and Al2O3 is a ceramic with properties second only to diamond used for crucibles, catalysts, thermionic coatings, etc. Alumina (and potentially silica) was subjected to molten salt electrolysis at 900oC to yield 95