

MAGNETIC CONTROL OF GRANULAR FERROMAGNETIC MEDIA IN MICROGRAVITY FOR ADVANCE LIFE SUPPORT APPLICATIONS

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Abstract.

Advanced magnetic control methods have been developed which allow precise control over the degree of fluidization, or conversely, the degree of consolidation of beds of granular ferromagnetic media. These control techniques provide an effective means to consolidate media into fixed beds without any additional forces or forms of confinement. Materials may also be separated based upon intrinsic differences in magnetic susceptibility. Perhaps most importantly, these methods can be used to produce any desired degree of fluidization in the absence of gravity, an operation which otherwise cannot occur. This makes possible the operation of fluidized bed based technologies in both microgravity and hypogravity environments. Potential Advanced Life Support (ALS) applications of the magnetic control methods include: atmospheric revitalization, solid waste treatment, and water recovery. The emerging technology may also prove beneficial with respect to *in situ* resource utilization (ISRU) and microgravity materials science. Here we discuss the results of magnetically assisted fluidization and magnetic separation experiments and their simulation using Computational Fluid Dynamics (CFD).