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## **Thu-Mo-Po4.12-05 [92]: Magneto-Archimedes levitation properties for metals by ferromagnetic material arrangement in magnetic fields**

*Thursday, 26 September 2019 08:45 (2 hours)*

We have studied magnetic levitation properties for valuable metals by magneto-Archimedes effect under a high magnetic field gradient. In order to enhance the magnetic force factor  $BdB/dz$  in vertical direction, a ferromagnetic cylinder and an array of cylinders were set into the room temperature bore of a 10 T superconducting magnet. We optimized the shape and the arrangement of the ferromagnetic cylinders to increase the magnetic force. The maximum  $BdB/dz$  achieved the high value of over -1600 T<sup>2</sup>/m which was about 4 times larger than that without ferromagnetic materials. The magnetic levitation properties for several kinds of precious metals such as silver, gold and platinum in manganese chloride aqueous solution as a paramagnetic medium were studied. Each precious metal levitated at different height in relatively low magnetic fields. The ferromagnetic cylinder array made the metal grains levitate uniformly in a horizontal direction. This result proposes a new magnetic separator for valuable resource recovery in relatively low magnetic fields utilizing magneto-Archimedes levitation.

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