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Magnetic trapping of copper and silver using buffer gas loading NATHANIEL BRAHMS, Harvard University, BONNA NEWMAN, CORT JOHNSON, THOMAS GREYTAK, DANIEL KLEPPNER, MIT, JOHN DOYLE, Harvard University — Atomic silver and coppper are magnetically trapped using buffer gas loading. Copper (Cu) is trapped in the $4s\ ^2\mathrm{S}_{1/2}$, $m_j = 1/2$ state with lifetimes as long as 8s. Silver (Ag) is trapped in the $5s\ ^2\mathrm{S}_{1/2}$, $m_j = 1/2$ state with lifetimes as long as 2.3 s. Lifetimes are limited by collisions with background ^{3}He. Inelastic Zeeman state-changing collisions are observed between Ag and ^{3}He. The ratio of transport to inelastic cross-sections for Ag-^{3}He is found to be $2.9 \pm 0.2 \times 10^6$ at 410 mK in a 4.0 T anti-Helmholtz trapping field. The spin relaxation cross-section is observed to vary with temperature as $T^{5.8\pm0.4}$ between 300 mK and 630 mK and vary with trap magnetic field detph as $B^{-0.9\pm0.2}$ between 2 T and 4 T. The transport to inelastic cross-section ratio for Cu-^{3}He collisions is found to be $8.0 \pm 0.3 \times 10^6$ at 400 mK. Comparison is made to alkali-noble gas theory, showing that additional considerations are necessary beyond the typical treatment restricted to the s valence electron.

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