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**Selective Suppression of Sulfur by Photodetachment in a RF Quadrupole Ion Cooler**[1] THOMAS LEWIS, Department of Physics and Astronomy, The University of Tennessee, ALFREDO GALINDO-URIBARRI, CHARLES HAVENER, YUAN LIU, Physics Division, Oak Ridge National Laboratory — A method for selectively suppressing contaminants in negative ion beams through collisional cooling and photodetachment has been developed at the Holifield Radioactive Ion Beam Facility. Due to possible applications in Accelerator Mass Spectrometry, the potential for purifying a 36Cl beam of 36S contamination using this method was explored using stable S- and Cl- ions and a pulsed Nd:YLF laser at 527 nm. The laser's photon energy (2.352 eV) is above sulfur's electron affinity (2.077 eV) and below chlorine's (3.617 eV), allowing selective suppression of S. The laser beam was directed along the experiment's beam line and through a radio-frequency quadrupole ion cooler. Negative 32S and 35Cl ions produced by a Cs sputter ion source were focused into the ion cooler where they were slowed by collisions with He buffer gas; this increased interaction time of the negative ion beam and the laser beam. Suppression of S- by a factor of 3000 was obtained with about 2.5 W average laser power in the cooler while no reduction in Cl- current was observed.

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