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Sulphur Hexafluoride as a Stripper Gas for Tandem Accelerators

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We have investigated the use of sulphur hexafluoride as a stripper gas in tandem accelerators. We have used the ANTARES accelerator system at ANSTO to measure charge state distributions for this gas. Results are reported at 4MV terminal voltage for injected negative ions ranging from carbon to uranium oxide. For iodine and thorium the distributions are extended across a range of energies of practical use for accelerator mass spectrometry, ion beam analysis and other accelerator applications. Charge state distributions using sulphur hexafluoride are found to have mean charge states up to 1 charge unit higher than, and to be broader than, corresponding distributions for argon gas, except in the case of carbon beams. SF₆ is shown to provide significantly higher yields for charge states of heavy ions above the mean charge state. As a result, we now perform actinide AMS measurements with 9% yield to the 5+ charge state, compared to 4-5% achieved previously with argon gas.

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