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Recent ISOLTRAP mass measurements of medium-mass, neutron-rich nuclides in the 50-ms-half-life range

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Binding energies of neutron-rich nuclei are important for understanding the change of nuclear structure with neutron-to-proton (N/Z) asymmetry. One and two-nucleon separation energies are sensitive to the evolution of energy gaps in the effective single-particle spectrum. In mid-shell regions of intrinsic deformed configurations they are, in turn, key for the interpretation of complementary ground-state properties and of the low-lying excited states. One-neutron separation energies are also a direct input for r-process calculations, their precise knowledge being crucial for the correct prediction of r-process abundances. In this contribution, we present recent results obtained with the mass spectrometer ISOLTRAP at ISOLDE. We discuss recent measurements of the masses of cadmium isotopes up to A = 131, which have direct consequences on the description of the natural abundance of the A ≈ 130 r-process nuclides. We also present new masses of strontium and rubidium isotopes up to A = 102, which are the farthest exploration of the low-Z part of the region of deformed A ≈ 100 nuclides. The multi-reflection time-of-flight mass spectrometer (MR-TOF MS) of ISOLTRAP was essential in performing these measurements, acting either as fast beam purifier for Penning-trap mass spectrometry, or directly as the tool for precision mass measurements. Recent developments of ISOLTRAP's MR-TOF MS will be presented.

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