Advances in Radioactive Isotope Science



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Search for the Neutron Dripline for Fluorine and Neon Isotopes

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Particle-bound isotopes along the neutron dripline have been searched for fluorine (Z = 9) and neon (Z = 10) isotopes at the RIKEN RI Beam Factory (RIBF) by using projectile fragmentation of an intense 48Ca beam at 345 MeV/nucleon and the large-acceptance fragment separator BigRIPS. Observation of null counts for 32F, 33F and 35Ne, 36Ne isotopes and comparison with their expected production yields have showed that existence of particle-stable states of these isotopes is excluded with high confidence levels. It is thus found that the most neutron-rich isotopes 31F and 34Ne previously observed are the heaviest of these isotopes. The confirmed neutron driplines have thus been extended for the first time since nearly 20 years ago, in which the 24O isotope was confirmed to be on the dripline of oxygen (Z = 8) isotopes. The present determination of neutron driplines will provide keys to understand the nuclear stability at extremely neutron-rich conditions.

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