A NEW METHOD OF ISOTOPES SEPARATION IN CROSSED ELECTRICAL AND MAGNETIC FIELDS

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S u m m a r y

A new method of electromagnetic separation of isotopes is proposed. The results of numerical calculations of trajectories for lithium and gadolinium isotope ions are presented. The analysis of trajectories of isotope ion motion is carried out on the basis of equations obtained by solving the problem of motion of ions with different masses in constant axisymmetric radial electric and azimuthal magnetic fields in a vacuum chamber between two concentric nonmagnetic metal cylinders. It is supposed that the strengths of the electric and magnetic fields are inversity proportional to the distance from the longitudinal z axis of the system. Ions are injected into the device on some fixed radius in the plane $z = 0$, the velocity fluctuations being small as compared with the longitudinal initial velocity of ions, υ_{0z}. The efficient isotope separation in the space takes place if υ_{0z} of one of the isotopes is equal to the drift velocity in crossed fields. Calculations for ^{6,7}Li and ^{156,157,158}Gd isotopes with the set of values of fields and sizes of the device have shown that the trajectories of ion motion are flat, and the points of beam focusing are spaced apart both on a radius of the system and along the longitudinal axis. The magnetic system with given parameters is proposed on the basis of computer simulations. The technical project of the experimental device is worked out.