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Plasma mass filtering techniques: applications and requirements[1]
RENAUD GUEROULT, NATHANIEL J. FISCH, Princeton Plasma Physics Laboratory — Plasma mass filters differ from conventional chemical filtering techniques in that elements are dissociated, and can therefore be processed without regard to chemical form. In addition, plasma filters can be in principle operated at larger velocities compared to their gaseous and/or liquid counterparts, so that larger throughputs are possible. On the other hand, one has to pay the price of ionization, which sets a lower limit for the processing cost. Plasma mass filtering techniques are consequently foreseen as a promising solution for separation processes which are simultaneously chemically challenging and of high added value. Such separation processes can be, for example, found within the context of nuclear waste remediation, or nuclear spent fuel reprocessing. However, although plasma separation techniques appear globally attractive for these distinct needs, the plasma parameters required to fulfill a particular separation process are expected to depend strongly on the process's attributes (volume, composition, mass difference), which may vary significantly. Such operating parameters' variations are shown to be well accommodated by a particular configuration, called the Magnetic Centrifugal Mass Filter.

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