2 - 36 Study on Separation of Lanthanum and Actinide Ions with Porous Graphene in Aqueous Solution

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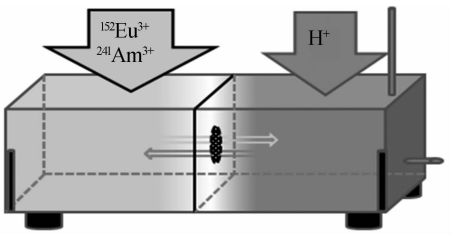

Fig. 1 the dialysis separation equipment of ^{152}Eu and ^{241}Am in solution.

Separation of membrane dialysis is the one of the common separation methods, but it is critical to make successfully the membrane with appropriate pore size to achieve the separation of materials of different sizes, however, the membrane separation is difficult to achieve the separation between the different chemical properties of similar size. If a single atomic layer of the dialysis membrane, after modified N-type flexible ligand atoms, was prepared to separate the metal ions of lanthanides and actinides, because coordination bonds of N elements with actinides was shorter than lanthanides, so actinides will firstly take precedence bits in the N atoms in left side, but for right side with high acidity, the H^+ ions will subsequently replace with actinides via ion exchange, and for left side, because high concentrations of actinides it will induce immediately ions exchange of actinides and H^+ from left side, so the cycle can achieve dialysis of minor actinides from high concentration to low concentration until the concentrations are equal on both sides. Graphene is a nano-particles of single atomic layer, having the physicochemical properties of high resistance to high heat radiation and high thermal conductivity, etc.. The graphene are irradiated by heavy ion, proton or electron beam to prepare the porous-graphene materials (PGPM), carbons atoms of sp3 in PGPM will be modified with organic compounds of nitrogen-containing to make the amino porous-graphene(APGPM). The monolayer graphene was firstly used to manage spent fuel via separating the radioactive metal ions, and that is the new separation processes of various metal ions in aqueous solution, and then it will expand the range of applications of graphene material.

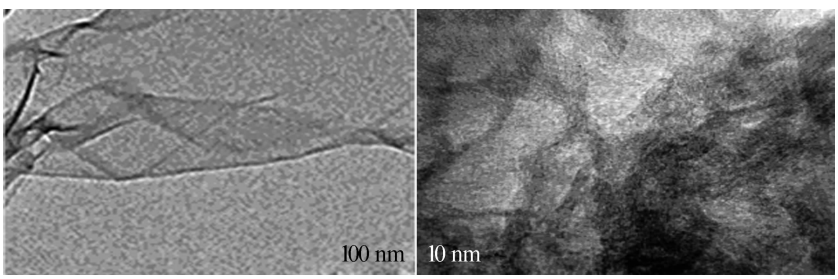

Fig. 2 The TEM of graphene irradiated by electron beam.