D-D 중성자 발생장치 시작품 설계 및 차폐계산
Design of a Prototype D-D Neutron Generator and Shielding Calculation

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요약

서울대학교에서 개발중인 D-D 중성자 발생장치의 설계개념을 요약하고 시작품(prototype) 개발의 진행사항을 기술하였다. 중성자 발생장치의 설계 목표는 중성자 수율 10^8 n/s, D+ 이온빔 전류 50 mA, 가속전압 120 kV이다. 현재는 이온빔 전류 10 mA, 가속전압 30 kV, 중성자 수율 10^4 n/s의 시작품에 대한 세부적인 설계를 수행하고 있다. 추가로 중성자 발생장치로부터 방출되는 중성자와 감마선에 대한 방사선 차폐를 위해 단순한 기하 조건에 대한 단순계산과 MCNP 모사를 수행하여 방사선 차폐설계의 정량적 기준을 마련하였다.

Fabrication of Continuous Polycrystalline Uranium Foil Using the Cooling-roll Casting Method

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Abstract

As the uranium foils for Mo-99 irradiation target charged into a reactor can be fabricated at a laboratory scale, but not at a commercialized scale by the hot rolling method due to some problems in foil quality, productivity and economic efficiency, attention has shifted to the development of new technology. Under these circumstances, the alternative fabrication method of uranium foil was developed in KAERI using cooling roll, in order to produce the fission isotope ^{99}Mo, the parent nuclide of ^{99m}Tc. The continuous and uniform uranium foil has been rapidly solidified, directly from a melt through the cooling-roll casting method. In order to develop the fabrication technology of the wide foils with reliability, the fabrication and characterization of the uranium foils using the cooling-roll casting method were carried out in this study. The polycrystalline uranium ribbons with a thickness ranging from 100 to 200μm were cast continuously exceeding10m in length for one batch procedure. Major advantages of the cooling-roll casting process were obtained as follows: 1) a simplified process without the hot-rolling process and heat-treatment process, 2) an improvement in productivity and yield in foil fabrication, and3) a high purity and a high quality of foil, 4) a very fine polycrystalline structure.