

物理

ADS散裂靶产生的放射性毒性

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摘要 利用SHIELD程序计算不同能量质子照射不同靶产生的散裂产物分布。采用年摄入量限值(ALI)标准定义的放射性毒性, 对散裂靶中散裂产物产生的放射性毒性进行研究分析。研究表明: 散裂产物具有较大的毒性, 特别是在加速器驱动的次临界系统(ADS)要求的入射粒子(质子)能量下, 产生了一些处于稀土区长寿命的 α 放射性核素。这些核素若不能在辐射场中被嬗变掉, 其毒性将对生物环境产生长期的影响。

关键词 [加速器驱动次临界系统](#); [放射性毒性](#); [年摄入量限值](#)

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Radiological Toxicity of Spallation Targets in Accelerator-Driven Sub-critical System

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Abstract The spallation products from spallation reaction of spallation target triggered by high energy protons in accelerator-driven sub-critical system(ADS), were calculated under different material targets and various energy incident protons respectively using SHIELD code. Then the radiological toxicity of spallation products was studied by applying the concept of annual limit of intake (ALI). It reveals that the toxicity of the spallation products is often on high-rate, especially those α emitting rare earths (RE) caused by the incident proton under the ADS required energy largely contribute into overall toxicity of spallation targets. These nuclides will exert a radiological hazard on the biotic environment, if do not transmute them in the radiant field.

Key words [accelerator-driven sub-critical system](#); [radiological toxicity](#); [annual limit of intake](#)

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