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核燃料棒~(235)U富集度均匀性扫描装置中的中子慢化系统计算

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摘要 对于核燃料棒235U富集度均匀性扫描装置,为了合理有效地利用252Cf中子源,提高检测灵敏度,需要合理选择中子慢化材料,优化中子慢化过程。本文利用Monte Carlo方法对中子慢化系统进行了优化计算,在保证慢化中子(En<1MeV)通量密度较高和235U与238U的裂变反应几率比R5/8也较高的前提下,给出了几种慢化材料及其组合的结果。

关键词 中子慢化 Monte-Carlo方法 核燃料棒 252Cf中子源

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Neutron Moderation Calculation for Nuclear Fuel Rod Scanner

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Abstract In order to use ~(252)Cf source effectively and improve testing sensitivity of the nuclear fuel scanner, appropriate moderation material should be selected carefully, and the process of neutron moderation should be optimized. In the paper, neutron fluence rate distributions in several moderation materials were calculated with Monte-Carlo method. The results of several materials and their combinations are given, the higher slowing-down neutron fluence rate and the higher ratio of ~(235)U to ~(238)U fission possibility simultaneously can be got.

Key words neutron moderation Monte-Carlo method nuclear fuel rod ~(252)Cf neutron source

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