

Development of a dosimeter for $H_p(0.07)$ monitoring

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Abstract: In view of the poor performance of dosimeters for low energy β rays monitoring in China, a ZF-P7 $H_p(0.07)$ dosimeter was developed, based on LiF:Mg,Cu,P thermoluminescence detector and combined with simulation calculation, in order to solve the problem of accurate measurement of $H_p(0.07)$ dose in β and γ mixed fields. The performance test results of ZF-P7 $H_p(0.07)$ dosimeter are as follows: For the maximum energy of 225 keV–2.274 MeV of β rays, the energy response ranges is 0.67–0.95; For energies between 16 keV to 1250 keV of X or γ rays, the energy response ranges is 0.66–1.45; Within the range of 100 μ Sv–1.2 Sv, the dose linearity is 0.91–1.10; Under the X radiation of 65 keV and angle range of 0° to $\pm 60^\circ$, the angle response of -60° to 60° is 0.99–1.09; Under the β radiation of ^{85}Kr , the angle response of -60° to 60° is 0.94–1.11. According to the measurement results, the performance of ZF-P7 dosimeter meets the requirements of EJ/T 1178—2005 and JJG 37—2014. Because the ZF-P7 dosimeter has excellent performance, especially the radiation response is good at X, γ , β mixed radiation field, which can solve the problem of operators' $H_p(0.07)$ dose monitoring in the mixed radiation fields. It can be widely used in the $H_p(0.07)$ dose monitoring for workers in the mixed radiation fields.

Key words: weak penetrating radiation; $H_p(0.07)$; β/γ mixed fields; thermoluminescence detector

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NEA 的小型模块化反应堆 (SMR) 战略

小型模块化反应堆 (SMR) 在功率输出和物理尺寸方面都比传统的千兆瓦级核反应堆小。通常, SMR 是功率输出小于 300 兆瓦电力 (MWe) 的核反应堆, 有些小至 1~10 兆瓦。

SMR 专为模块化制造、生产、方便移动性和可扩展部署而设计。SMR 利用核裂变反应产生可以直接使用的热量, 或用于发电。一些小型模块堆基于目前部署的技术, 而另一些则基于所谓的“第四代”和先进的反应堆概念。

2021 年核能署 (NEA 报告)《小型模块化反应堆: 挑战与机遇》概述了中小型模块堆开发和部署的最新进展。该报告讨论了这种创新核技术的主要经济驱动因素, 并强调了小型模块堆支持脱碳战略、补充可变可再生能源以及促进新部门和地区获得核能的市场机会。该报告还强调了审查监管和法律框架的必要性, 并建议将中小型模块堆分为不同的类别, 以支持这些政策变化。最后, 报告强调了政府支持和国际合作在实现大规模 SMR 部署方面的作用。

SMR 带来了许多独特的设计功能, 支持这些创新反应堆的安全案例和经济性。这包括有助于稳健固有安全案例的整体设计, 减少应急规划区需求的低核心库存, 改进的模块化和可制造性, 这将改变核电新建交付模式, 以及提高核能的灵活性, 以进一步支持可变可再生能源在电力结构中的整合。

在 NEA 的最新出版物《实现气候变化目标: 核能的作用》中可阅读更多关于小型模块堆有助于减缓气候变化工作的潜力。

(来源: NEA 网站)