

## 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  $\beta$  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  $\beta$  and  $\gamma$  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  $\beta$  rays, the energy response ranges is 0.67–0.95; For energies between 16 keV to 1 250 keV of X or  $\gamma$  rays, the energy response ranges is 0.66–1.45; Within the range of 100  $\mu$ 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 ±60°, the angle response of -60° to 60° is 0.99–1.09; Under the  $\beta$  radiation of  $^{85}\text{Kr}$ , 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,  $\gamma$ ,  $\beta$  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;  $H_p(0.07)$ ;  $\beta/\gamma$  mixed fields; thermoluminescence detector

### · 简讯 ·

## 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。

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