

技术及应用

# 中子气泡探测器用于核测井中子个人剂量监测的研究

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**摘要** 为研究国产中子气泡探测器在核测井中子个人剂量监测中的适用性, 采用国内研制的中子气泡探测器对核测井运源车外表面、车内兼用储源仓周围等关注点的中子辐射水平进行监测, 同时采用进口LB6411型中子周围剂量当量仪进行比对监测。实验结果表明, 当运源车兼用储源仓内仅装载中子源时, 中子气泡探测器与LB6411的测量结果无显著统计学差异, 两者测量结果符合较好, 中子气泡探测器的测量结果准确可信; 当兼用储源仓分别装载中子源、中子-γ源时, 两组中子气泡探测器的测量结果也无显著统计学差异, 中子气泡探测器适用于中子-γ混合辐射场中子辐射剂量的测量。中子气泡探测器在运源车现场与在<sup>241</sup>Am-Bc源标准中子场中的剂量响应灵敏度因子间的相对偏差为7.4%, 验证了其较好的能量响应特性, 并显示了在核测井现场条件下用于中子个人剂量监测的适用性。

**关键词** [中子气泡探测器](#) [核测井](#) [中子个人剂量监测](#) [场刻度](#)

分类号

## Application of Bubble Neutron Detector to Neutron Personal Dosimeter in Nuclear Well Logging

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**Abstract** In order to study the feasibility of bubble neutron detector (BND) to neutron personal dosimeter in nuclear well logging, radiation levels at points concerned inside and outside the radiation source vehicle for nuclear well logging were measured by using both domestic BNDs and neutron ambient dose equivalent meter (LB6411). The results show that there are no statistical differences both between the measured data from BND and LB6411 while neutron source loaded in the vehicle alone and between the data from BND at neutron-γ source loaded and without γ-source loaded in vehicle, respectively. The BND' dose response performance was calibrated at two field conditions, and the relative deviation between the calibrated sensitivity factors is 7.4%. It is clear that the BND can be used in measuring neutron radiation in neutron-γ mixed field, and the dose response is independent of neutron energy within a certain energy range. And the applicability of BND to neutron personal dose monitoring in nuclear well logging is experimentally validated.

**Key words** [bubble neutron detector](#) [nuclear well logging](#) [neutron personal dose monitoring](#) [field calibration](#)

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