

技术及应用

# 用D-D中子发生器测量水泥生料中的元素含量

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收稿日期 修回日期 网络版发布日期:

**摘要** 以D-D中子发生器作为中子源, 用瞬发 $\gamma$ 中子活化分析 (PGNAA) 检测水泥生料中主要元素Si、Al、Fe和Ca及其氧化物的百分含量。水泥生料中各元素被中子辐照而释放瞬发 $\gamma$ 射线, 通过测量 $\gamma$ 射线的能量和强度, 可对其进行定性和定量分析。测量结果与化学化验方法所得结果的相对偏差好于7.0%, 在允许范围内, 有较好的重复性。与化学化验方法相比, 该方法不破坏样品、用时短、可同时测量多种元素、精确度和准确度高, 能满足工业生产的要求。

**关键词** [D-D中子发生器](#) [瞬发 \$\gamma\$ 中子活化分析](#) [元素分析](#) [水泥生料](#)

分类号

## Elemental Contents in Cement Raw Meal Using D-D Neutron Generator

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**Abstract** The contents of main elements, Si, Al, Fe and Ca in cement raw meal were determined by prompt  $\gamma$  neutron activation analysis (PGNAA) with a D-D neutron generator as neutron source. Characteristic  $\gamma$ -rays of the elements were emitted when a sample was irradiated by neutron. Characteristic  $\gamma$ -rays of corresponding elements for cement raw meal were quantitatively analyzed by measuring the energy and the intensities. The results have good repeatability and the standard deviation is well within the allowable range. Compared with chemical method, PGNAA method can meet the demand of industrial production because of its short testing time, non-destruction, high accuracy, high precision and the ability to measure many elements simultaneously.

**Key words** [D-D neutron generator](#) [prompt  \$\gamma\$  neutron activation analysis](#) [elemental analysis](#) [cement raw meal](#)

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