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Developments of counting rates correction method and its use in the $4\pi\beta - \gamma$ coincidence counting

$4\pi\beta - \gamma$ coincidence counting has been widely applied in the absolute radioactivity measurement for its high accuracy and enabling measurement of most radionuclides without any specific values being assumed. The $4\pi\beta - \gamma$ method has a lot of variants according to the radionuclide and detector types, among which the digital coincidence counting (DCC) is quite outstanding. the DCC routine generally consist of five sections: the front-end electronics section, the digitalizer section, the coincidence logic section the counting rate correction and the efficiency extrapolation section. Generally, the formulae used in the counting rate correction section is derivated according to specific application scenatios, which lead to the formulae quite complex and can not be used widely. In this study, a improved method is proposed based of the formulae put forward by Campion in 1959 and the living time method. The adapted method was applied in the DCC software used in the National Institute of Metrology (NIM) and was validated by comparing the results obtained by the previously validated method. The results indicate that the DCC software appiled the developed method had a tolerable error. The method is promising in the filed of radionuclide calibration for its generality and reliability

Minioral

Yes

IEEE Member

No

Are you a student?

Yes

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