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Yasuhito Isozumi, Mitsuo Tosaki

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## Needle counter for neutron counting

Yasuhito Isozumi and Mitsuo Tosaki

*Radioisotope Research Center, Kyoto University, Kyoto 606-8501,*

*Japan*

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### Abstract

A radiation counter with a needle anode has been developed for detection of thermal neutrons; the diameter of sensitive area is 5 mm and the filling gas is the mixture of  $^3\text{He}$  and Q gas ( $^4\text{He}$  + 1%isobutane) with pressures of 0.3-1.0 MPa. An interesting response has been found in the counter operation for thermal neutrons; there is no proportional-counter region, while it normally works in both ionization-chamber and GM-counter regions. The  $\gamma$ -ray background, which is one of difficulties in the neutron detection, can be effectively removed by the lack of proportional-counter region. In this paper, the performance of the needle counter is described in detail.

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