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Seção
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Neutron fluence measurements for Boron Neutron Capture Therapy (BNCT)

Sandro Guedes
Bárbara Smilgys
Julio Cesar Hadler

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Resumo

The Boron Neutron Capture Therapy (BNCT) is an internal radiotherapy, in which 10 B compounds, selectively delivered to tumor cells, capture neutrons from an external source, emitting an particle and a recoil 7 Li nucleus. These two particles present high LET and their combined range (< 10 m) is in the magnitude of the cell radius, ideally affecting only the tumor cells, sparing healthy tissue. However, in spite of the high cross-section for the reaction 10 B(n,)7 Li, 3,800 barn, recoil of nitrogen, oxygen, carbon and mainly hydrogen, present in healthy tissue, after fast neutron recoil, give rise to a low LET component for the dose that has to be taken into account for treatment purposes. Other fast neutron reactions ((n,p), (n,) and (n,d)) with nitrogen, oxygen and carbon, may also become important for higher neutron energies.In this way, accurate determination of neutron fluencies, preferably separating thermal and epithermal components, are desirable for treatment planning as well as for evaluating studies of biodistribution in candidate boron-carrier drugs. In this presentation, the important aspects for the BNCT application are reviewed and a technique for measuring 10 B(n,)7 Li reaction rate and the fast neutron component, based on etched-track detector and boron thin films, is presented and discussed.