

Superheated emulsions (SE) of halocarbon-12 have been employed in the assessment of the fast neutron doses at depth in a patient undergoing BNCT at the BNL Medical Reactor. SEs consist of uniform suspensions of over-expanded halocarbon droplets dispersed in a viscous emulsifier medium. Nuclear interactions nucleate the phase transition of the superheated drops therein generating detectable bubbles. Our approach derives from the observation of the agreement between the response of halocarbon-12 emulsions and the "kerma-equivalent-factor", i.e. the average tissue kerma of neutron recoils from first collisions with a small element of soft tissue, weighted by the quality factor of the recoils. This is the ideal response function for the determination of dose equivalent inside a phantom, provided charged particle equilibrium is attained at the point of measurement and the kerma-to-dose approximation therefore valid. For the present study, measurements were carried out in a phantom consisting of an anthropomorphic head attached to a tissue equivalent liquid tank. The SE dosimeters were placed at various distances from the head along the midline of the phantom. Our data are presented and compared to the estimates of fast neutron dose produced for the same irradiation geometry by the BNL treatment planning codes.