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Simulating response of C^7LYC detector for fast neutron detection[1] SUDIPTA SAHA, PARTHA CHOWDHURY, ANDREW M. ROGERS, PETER C. BENDER, University of Massachusetts Lowell — A detailed Monte Carlo simulation code has been developed to study the response of ^{7}Li-enriched Cs_2LiYCl_6(C^7LYC) detectors using the Geant4 simulation framework. The intrinsic efficiency of a 1 thick shell of C^7LYC material is calculated for fast neutrons in the range 0.5 - 8 MeV and are compared with prior MCNP simulations and data. Contributions from ^{35}Cl(n,p) and ^{35}Cl(n,α) reactions are differentiated and studied in the simulated spectrum. The detector efficiency as a function of energy is deduced using different cross-section evaluations and recent experimental measurements. Light output for both 3" x 3" and 1" x 1" C^7LYC detectors were simulated according to the Birks equation, with parameters deduced from experimental spectra. From this quenching factors for the light output of alphas and protons in C^7LYC are calculated from calibrated gamma-ray spectra. The simulations will be discussed in the context of benchmarking C^7LYC as an emerging scintillator for fast neutron measurements.

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