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Development of a Plastic Phoswich for Reaction Studies C. THORNSBERRY, K.L. JONES, D. PARTINGTON, K. SMITH, Univ of Tennessee, Knoxville, M. FEBBRARO, Oak Ridge National Laboratory, P. O'MALLEY, J. KOLATA, Univ of Notre Dame, F. BECCHETTI, Univ of Michigan, TWINSOL COLLABORATION — In inverse kinematics, proton transfer reactions, such as (d,n), may be used to add a proton to a short-lived ion beam. By detecting the outgoing neutron, it is possible to extract spectroscopic information about the recoil nucleus. Plastic scintillators may be used for detecting these neutrons but are sensitive to gamma rays as well as neutrons, usually resulting in a large background. A clean tag on the recoil particle is often necessary for the removal of significant unwanted background from reactions with low cross sections. A plastic scintillator phoswich (phosphor-sandwich) was developed in order to separate the recoil nucleus from a radioactive ion beam cocktail. This phoswich is comprised of two layers of plastic scintillator, with two different pulse shape characteristics, fused together to produce a single assembly viewed by a PMT. Using pulse shape discrimination (PSD) on the resultant digitized light pulses allows for Z separation at rates of up to $1x10^6$ pps. Since the recoil particle has one extra proton than the beam particle, it is only necessary to have separation in Z. This detector was successfully tested during a development experiment at the University of Notre Dame. An overview of the motivation, development, and analysis of this detector will be present

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