Scrubbing system Supporting tritium gas target for research at HI-S

TALISI MEYER, Simmons University, COLLIN MALONE, CALVIN HOWELL, Duke University, TUNL — Tritium, a radioactive isotope of hydrogen, will be the basis of study of P-02-13 at HIGS. This study will use a tritium gas target to obtain cross-section measurements of two- and three-body photodisintegration of the triton in order to further understand nuclear structure and reactions, specifically three nucleon interactions (3NI). Tritium scrubber systems are necessary in order to safely handle the tritium inventory. These systems use a Copper-Zinc catalyst to convert elemental T₂ into T₂O or HTO, allowing the tritiated water to be collected in a molecular sieve bed and safely disposed of. Reactions catalyzed by the CuZn bed were examined using a Residual Gas Analyzer at temperatures ranging from 23°C to 190°C. Isotope concentrations and compositions of the various gas streams that will flow through the scrubbing system during normal operation were monitored over time to characterize the catalyst’s behavior. Primary gases include Helium (~5 LPM), 1% Oxygen in Helium (~5 LPM), Hydrogen (50-100 sccm), and H₂O formed from the catalytic reaction. Through this research, the use of a CuZn bed as a catalyst in this scrubbing system was verified and found to work optimally at higher temperatures.

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