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Studying synthesis of Hg-196 through measurement of capture reaction cross-section of (p, γ), (p, n) and (p, α) reactions. KHUSHI BHATT, MICHAEL FAMIANO, SHIVI SAXENA, RAMAKRISHNA GUDA, ASGHAR KAYANI, HAYDEN KARRICK, MARK SIEGEL, SHIVA AGARWAL, LUKE BESSLER, TREVOR WENDT, CHRISTOPHER DESMON, CLAIRE GEORGE, ERIC HELGEMO, Western Michigan University — The p-nuclei (proton-rich nuclei) are among the rarest of all the known stable nuclei. Although majority of nuclei heavier than iron are produced by neutron capture processes, p-nuclei cannot be produced by any of those processes. The astrophysical processes responsible for the synthesis of p-nuclei are not fully understood. Of the 35 known p-nuclei, the heaviest is Hg-196. The synthesis of Hg-196 is studied through the method of activation using (p, γ), (p, n) and (p, α) reactions. A mono-energetic beam of proton is incident on a homogeneously thin, solid HgS (mercury sulfide) target of ˜10 mg/cm^2 thickness and capture reaction cross-sections are measured for each reactions mentioned above. The specific kind of required mercury target has been developed using the drop-casting method, at ambient temperature and pressure. The production methods are described along with the experimental method resulting in a self-calibrating activation experiment.

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