Preparation of an ^{115}In source

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We required an ^{115}In target for neutron activation to produce an ^{116}In source as part of our program to measure and test Internal Conversion Coefficients [1]. Since enriched ^{115}In is only available as indium(III)-oxide powder, In_2O_3, we first investigated methods for producing a thin indium target using the oxide powder of natural indium, which is considerably less expensive. We prepared the final target with In_2O_3 enriched to 99.83% and supplied to us by Trace Sciences International.

According to the CRC Handbook of Chemistry and Physics [2], indium-oxide is not soluble in water but is soluble in acids. For our purposes we chose nitric acid, HNO_3. The procedure we found to be the most successful started with our preparing a glass slide by completely covering it with a piece of 4-μm-thick Mylar. We then took a 12-μm-thick piece of Mylar with adhesive on one side and placed it, adhesive side down, over the thin Mylar, wrapping its ends around the glass slide to attach the combination to the slide. This provided a non-stick surface upon which the target material could be placed, while allowing the finished product to be gently lifted off the glass slide without risk of serious deformation.

Next we weighed out approximately 1 mg of the oxide powder using a Mettler balance and placed the material on the Mylar surface of the prepared slide. A few drops of nitric acid were then injected into the powder with a small disposable syringe. The powder dissolved in the acid and the solution was subsequently dried on a standard laboratory heater/stirrer. The drying process left a fine powder evenly-spaced in a roughly circular configuration. By inspection under a microscope, we found the grains of powder to be < 2 μm in diameter. Once the powder was completely dry, the Mylar substrate supporting it was gently lifted off the slide, and immediately covered with a matching piece of 12-μm-thick Mylar, adhesive side down. The edges were then trimmed, leaving no adhesive surface still exposed. This process produced a very thin sample of $^{115}In_2O_3$, 1-2 μm thick) with a covering of Mylar on one side of 16 μm, and on the other, of 12 μm.

The finished samples will be transported at a future date to the Triga Reactor at the Nuclear Science Center, Texas A&M University for irradiation. Our group anticipates that the irradiation will occur in late June or early July, 2011.

[1] N. Nica, J.C. Hardy, V. Horvat, V.E. Iacob, V. Siller, and M.B. Trzhaskovskaya, *Progress in Research*, Cyclotron Institute, Texas A&M University (2010-2011), p. I-32.

[2] *CRC Handbook of Chemistry and Physics*, CRC Publishing (Cleveland, Ohio), D.R. Lide (ed.), 2009.