

GRATUITOUS COMMENTS ON OPERATION OF A CTI C-13/WATER SLURRY TARGET FOR THE PRODUCTION OF N-13 AMMONIA

(Reference: Bruce Wieland's poster)

A CTI Cyclotron Systems carbon-13/water slurry target was placed in service on our CS-30 cyclotron in August 1988. An energy degrader was installed to reduce the 27.3 MeV proton energy to about 19 MeV. Initial operation showed excessive production of ^{15}O by the p,pn reaction on the ^{16}O in the natural water. A thicker degrader was installed to reduce proton energy to a nominal 16.6 MeV, and eliminated ^{15}O production.

Bombardment is at $3\ \mu\text{A}$ for 4 min. with no water flow, and for 3.67 min with 1.5 mL/min. flow, which delivers about 5.5 mL to a receiver vial in the hot lab.

Operation of this "unit dose" target and ^{13}N ammonia production system has been consistent and trouble free. Saturated yields averaged about $40\ \text{mCi}/\mu\text{A}$ over about 200 runs. Carbon-13 was added twice when yield of ^{13}N ammonia was diminishing.

A ruptured entrance foil on 5/31 required extensive beam line and collimator cleaning as well as a complete reload of ^{13}C . The first three runs showed greatly elevated saturated activity, after which production returned to normal.

The stainless-steel frits confining the ^{13}C to the target become clogged with the carbon after several runs. Simply reversing the direction of target water flow corrects the condition for 10-15 runs. Clogging of the frits, once thought to be a problem, has turned out to be a condition that must be monitored, but is manageable. The CTI control system prints out target pressures by which elevated pressures due to frit-clogging can be followed.

