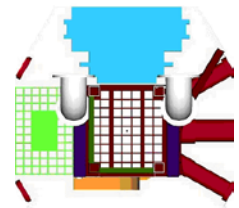




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RADIATION LABORATORY

FAST NEUTRON IRRADIATOR SAMPLE REQUIREMENTS

The fast neutron irradiator (FNI) can accommodate a sample or samples with size up to 30cm in diameter and 15cm thick including packaging materials. The minimum neutron fluence rate is $1 \text{ E}8 \text{ n/cm}^2\text{-s}$. The maximum neutron fluence rate is $1 \text{ E}11 \text{ n/cm}^2\text{-s}$. (both values are 1 MeV equivalent).

NOTE: For a uniform dose within +/- 10%, the sample size should not exceed 20cm x 20cm.

Neutron Dosimetry

The neutron fluence rate is determined using the previously measured neutron radiation field for the FNI, performed in accordance with ASTM standards¹, and correlated to the measured reactor power level. The neutron dose is timed to meet the customer specified fluence for the irradiation.

If requested, sample specific neutron dosimetry meeting ASTM standards can be made available at an additional cost.

Irradiation Test Planning

For adequate test planning a description of the samples, including approximate physical dimensions and elemental composition details (as accurate as possible) should be provided (see Note below). If COTS components are used, a manufacturer part number is helpful for us to obtain a RoHS sheet. If the components are proprietary, an estimation of the elemental composition is helpful. In addition, a description of which parts are to be irradiated to which level should be provided along with any special handling instructions.

Note:

Parts containing elements such as gold, manganese, arsenic, and others have particularly high neutron resonance cross sections that produce radioisotopes. The radioisotopic concentration is a direct function of the quantity of the elements present and the neutron irradiation fluence level. Irradiated samples shall be returned when the applicable Federal Regulations for shipping and receiving radioactive materials are met.

On-site Electronic Component Testing

Space and lab benches for testing can be made available for customers who wish to test parts on-site, at no additional charge.

ASTM Standards Used:

ASTM F1190 Neutron Irradiation of Unbiased Electronic Components

ASTM E265 Measuring Reaction Rates and Fast-Neutron Fluences by Radioactivation of Sulfur-32