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**PREPARATION OF A THIN-FILM NEUTRON CONVERTER FOILS FOR  
IMAGING DETECTORS**

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## **Preparation of a Thin-film Neutron Converter Foils for Imaging Detectors**

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With the pending delivery of the new Spallation Neutron Source at Oak Ridge National Laboratory a new generation of highly efficient, position sensitive neutron detectors needs to be developed. One promising prospect for detector development has been the neutron imaging detector, which consists of a conversion foil and is based on the production of  $\alpha$  and  $\beta$  particles from incident neutrons. Historically the conversion efficiency has been low in these foils. To enhance the conversion efficiency, foils consisting of multiple converters and complex geometries need to be developed. In order to understand the materials chemistry between multiple converters as well as to maximize the production and detection of the daughter products we have prepared and characterized a series of thin-films from naturally occurring isotopes of the strong neutron absorbers Li, B and Gd. The films have been created using a combination of sputtering and evaporation techniques. The composition of the resulting films have been investigated using EDAX and RBS while the interfacial mixing between the layers has been studied using a combination of RBS and SEM experiments. Experiments studying the aging of the detector films in the detector gas as well as electrochemical alloying with Li and the film substrate have also been undertaken and the results will be reported here.

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