

Abstract Submitted  
for the 4CF17 Meeting of  
The American Physical Society

**Development of a radioactive holmium-166 skin patch to treat skin diseases** MARTIN RITTER, FREDERIC SARAZIN, JERAMY ZIMMERMAN, Colorado School of Mines — Skin cancer is the most common form of cancer affecting over 3 million people per year in the US alone. The two most common forms of cancer, basal and squamous cell carcinoma, are easily removable if detected early and properly treated. These cancers can become deadly if allowed to spread. There currently exist multiple treatment options with varying success rates such as surgical excision and radiotherapy. However, these methods are not suited to treat sensitive areas such as the eyelids, nose, and lips. We propose a holmium based radioactive skin patch to achieve locally therapeutic radiation doses with no damage to underlying tissues. Holmium-166 is a beta emitter produced by a neutron capture by holmium-165 with a maximum energy of 1.8 MeV and a half-life of 26.84 hours. The half-life of the holmium allows production the patches off-site and the radiation type deposits over 90% of the dose within 2 mm of skin. We used DC sputtering to deposit a thin film of holmium on a Kapton substrate and characterized the thickness and uniformity of the film with a scanning electron microscope. We activated the holmium at the 1 MW TRIGA reactor located at the Federal Center in Lakewood, CO and achieved activities of up to 1 mCi, an activity within the range for therapeutic treatment.

Martin Ritter  
Colorado School of Mines

Date submitted: 18 Sep 2017

Electronic form version 1.4