

Palladium and Palladium Gold Alloys as High Z Coating for IFE Targets*

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Inertial Fusion Energy (IFE) reactors require laser targets that have a high-Z coating that must be both highly permeable and reflective. We have deposited Pd on shells while they were agitated to obtain uniform, reproducible coatings. We have used an x-ray fluorescence technique to accurately measure thicknesses and uniformities of the deposited layers on shells. We have demonstrated that these palladium coated shells are substantially more permeable than gold, the previous high-Z material used. Traditionally observed cracking of Pd on flats exposed to D₂ was not observed on shells. The main disadvantage of Pd coatings compared to gold is the lower reflectivity, which, in ensuring target survival, leads to a lower working temperature of the proposed fusion reactor first wall. Au/Pd alloy compounds were then examined in the hopes of higher reflectivity combined with high permeability. Au/Pd alloys of different compositions were co-sputtered onto shells and were found to be more reflective yet just as permeable as the Pd coatings. Initial work has been done to determine the optimum configuration and composition of such alloy coatings.

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