

Abstract Submitted
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Silicon Wafer Transmission Window for Electron-Pumped Laser Systems C.S. MCGUFFEY¹, C.A. GENTILE, C. PRINISKI — An electron beam transmission window has been developed as a component for the Electra Krypton Fluoride laser at NRL. Such KrF lasers will be employed in direct drive IFE. The transmission window is composed of a 1/4" thick aluminum anode frame arrayed with 24 silicon wafer windows, 150 μ m thick. The window must endure 2.3atm pressure differential, high temperature (400°C), $\sim 10^8$ shots and allow electron transmission into the KrF lasing medium >80%. A 1.2 μ m diamond passivation layer shields from the corrosive fluorine gas. Wafers are bonded to the aluminum frame using RTV sealant. Wafers withstood pressures up to 2.5atm at 600°C. A prototype 4x6 wafer array was tested at the laser site at NRL. The wafers shattered after 180 shots. Transient thermal stresses or arcing may have caused the initial failure. Conducting RTV will allow heat and charge to dissipate from the wafers. A pulsed laser will be used to investigate the effect of beam power on the wafers. Further diagnostic testing at NRL is crucial to the next advancements.

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