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Optical Constants of Uranium Oxide Thin Films, 1.25 to 6 eV[1]

JORDAN BELL, DAVID ALLRED, Brigham Young University Physics and Astronomy — The optical constants of uranium oxides are important for many applications including homeland security. Uranium forms many different oxides in many phases, making it difficult to study. In an effort to investigate optical properties of various uranium oxides, we used DC magnetron reactive sputtering (also utilizing a novel approach to improve thickness uniformity) to deposit three films, of approximate average thickness 44 nm, 114 nm, and 413 nm. We analyzed the films by multiangle spectroscopic ellipsometry, giving optical constants of roughly 1.8 to 2.2 for n, and 0 to 0.5 for k, over the range of 1.25 to 6.2 eV. The band gaps of the various materials are around 3.1 eV for direct band gaps, and 2 and 2.8 eV for indirect band gaps.

[1]NSF REU Program

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