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Combinatorial Development of Multi-Component Materials

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Abstract

A multi-component, evaporative doser is being developed for deposition of thin films of multi-component materials, $A_xB_yC_{1-x-y}$, with lateral gradients in composition across their surfaces. These films will serve as materials libraries whose properties can be spatially resolved in order to measure property as a function of composition, x and y . The development of such a methodology can be used to explore property-composition relationships in all areas of materials science. One of the proposed applications is the identification of Pd_xCu_{1-x} alloys for hydrogen separation and purification applications. The second application is the identification of II-VI semiconductors with compositions, $Cd_xZn_{1-x}S_{1-y-z}Se_yTe_z$, that have been optimized to give optical absorption across the solar spectrum.