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**Materials Identification for Quantum Dot Intermediate Band Solar Cells Including the Effect of Strain** SOM DAHAL, Arizona State University, Tempe, AZ, K.-Y. BAN, Arizona State University , Tempe, AZ, CHRISTIANA HONSBERG, Arizona State University,Tempe, AZ, SOLAR POWER LABORATORY TEAM — Heterostructures that include self-assembled quantum dots (SAQDs) have been suggested as model systems for the realization of novel high efficiency solar cells such as those based on intermediate bands (IBs). The lattice mismatch in the epitaxial growth of these structures, necessary for the formation of SAQDs, introduces strain throughout the structure, making the selection of materials systems with appropriate physical parameters problematic. The model solid theory is used to calculate the energy band edge alignment at $\Gamma$ point of such quantum dot (QD) heterostructures including the effects of strain. With the modified band gaps due to strain, a materials search was performed for high efficiency QD solar cells among III-V binaries and ternaries with negligible valence band offsets. This requirement of the valence band offset along with the limited band gap ranges for optimum efficiency results in only a few feasible materials systems being identified. The optimum barrier/dot material system found was $Al_{0.50}In_{0.50}As$/ $InAs_{0.41}P_{0.59}$ for fully strained system.

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