Title:	Synthesis, characterization and excited state dynamics of Cs 4 CuSb 2 Cl 12 double perovskite
Authors:	Sapru, Shradha.
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Abstract:	Metal halide perovskites have recently emerged as one of the fastest growing photovoltaics technology. In the span of a decade, the efficiencies of these solar cells have increased from a mere 3.8% to 25.5%. Perovskite solar cells have developed as a technology with competitive efficiency values, facile synthesis methods and great potential, to either replace or be used in conjunction with silicon solar cells. In this respect, the most successful candidates are the lead halide perovskites, in particular, methylammonium lead triiodide (MAPbI 3). Despite this progress, these hybrid organic- inorganic lead halide perovskites have stability and toxicity issues. The film is sensitive to humidity and oxygen, the organic cations are volatile and lead ions are toxic in nature. Hence, there is a need to develop non-toxic alternatives to lead halide perovskites, and improve their stability and efficiency for solar cell applications. The recent development of double perovskites has proven as a viable alternative to lead halide perovskites. One of the materials gaining importance in this respect is the Cs 4 CuSb 2 Cl 12 (CCSC) double perovskite. CCSC has exhibited high photo- and thermal- stability, is tolerant to humidity and has a suitable bandgap. This makes CCSC a potential candidate to be used as an absorber material in solar cells. However, to better comprehend the utility of this material, it is important to understand the nature of its bandgap and its excited state dynamics. Here, we have synthesized the microcrystals of CCSC, investigated its band structure and using femtosecond transient absorption spectroscopy, we have explored the relaxation rates and pathways of hot-carriers in this material. An understanding of the hot carrier relaxation process in CCSC is essential to gain valuable information on its intrinsic carrier dynamics and applications for the development of hot carrier solar cells.
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