

# Hybrid Light-Matter States

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Strong coupling of light and matter can give rise to a multitude of exciting physical effects through the formation of hybrid light-matter states. When molecular materials with high transition dipole moments are placed in the confined fields of metallic microcavities or surface plasmons, Rabi splittings approaching 1 eV due to the interaction with the vacuum electromagnetic field are observed. This leads to fundamental changes in the properties of the coupled system. While strong coupling has been extensively studied due to the potential it offers in physics such as room temperature Bose-Einstein condensates and thresholdless lasers, the implication for molecular and material science remains mostly unexplored. After introducing the fundamental concepts, examples of thermodynamic, chemical and material properties of strongly coupled systems will be given to illustrate the potential of light-matter states for materials and devices.