**From Perovskites to Carbon Nanotubes: Novel Materials for High Performance Solar Cells**

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Organic and hybrid organic-inorganic systems are promising for use in solar cells owing to a vast library of materials, which are available at potentially low-costs. The organic-inorganic perovskite family of materials taking the crystal structure ABX3 (A = CH3NH3+, B=Pb2+, X = Cl-, I-, and/or Br-) has within the last 2 years been used to fabricate high-performance hybrid solar cells, with reported power conversion efficiencies now exceeding 19%. Here, I will first give a general overview of the progress in the field including the ongoing challenges. I will then present recent advances in Oxford and elsewhere on the fundamental understanding of these perovskite absorbers and device behaviour, including results demonstrating that the electron-hole diffusion lengths exceed 1 micron.

In the second part of my talk, I will present evidence for ultrafast charge transfer between a semiconducting polymer and a carbon nanotube. I will also present two methods in which the binding of multiple semiconducting polymers to carbon nanotubes can be manipulated to produce new and novel nanostructures which show promise for use in organic solar cells.