

Cobalt Complexes as Electrolytes in Combination with Copper(I) Dyes in Dye Sensitized Solar Cells

C. Wobill¹, C. E. Housecroft^{1*}, E. C. Constable^{1*}

¹University of Basel

In order to achieve higher efficiencies and prolong long-term stability in dye sensitized solar cells (DSCs) the widely-used iodine/triiodide electrolyte is replaced by various cobalt(II)/cobalt(III) polypyridyl complexes. In our research we use heteroleptic copper(I) complexes as dye sensitizers. The complexes consist of an ancillary and an anchoring ligand, both of which are bidentate polypyridyl containing units. The ancillary ligand harvests the incident photons and the anchoring ligand binds the complex to the semiconductor surface of the photoanode.

Since the most commonly used iodine/triiodide electrolyte has a number of major downsides such as its corrosive nature, absorption of visible light and its not-tunable energy level. Cobalt electrolytes address all these major drawbacks as they absorb less visible light, they are not corrosive and their energy level can be altered by modifying or exchanging the ligands.

In our research we test the combination of different copper(I) dyes with cobalt electrolytes whilst optimizing the concentration, solvent and changing the additives of the electrolyte