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# SOLUTION-PROCESSED SOLAR CELLS USING COLLOIDAL QUANTUM DOTS


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***Abstract*** Solution-processed photovoltaics offer a cost-effective path to harvesting the abundant resource that is solar energy. The organic and polymer semiconductors at the heart of these devices generally absorb visible light; however, half of the Sun's power reaching the Earth's surface lies in the infrared.

Solution-processed solar cells that harvest wavelengths beyond 1 μm were first reported in 2005, and were based on the application of quantum-size-effect-tuned infrared-bandgap colloidal quantum dots. Since then, we have reported externally-certified solar power conversion efficiencies exceeding 7%. Recent advances of interest include all-quantum-tuned tandem solar cells; and the emergence of all-inorganic colloidal quantum dot materials that use halide anions, instead of conventional organic ligands, for passivation.

I will summarize advances in the materials chemistry, fabrication, physical understanding, and performance-oriented engineering of colloidal quantum dot solar cells and light sensors.


Bio Ted Sargent received the B.Sc.Eng. (Engineering Physics) from Queen's University in 1995 and the Ph.D. in Electrical and Computer Engineering (Photonics) from the University of Toronto in 1998. He is the Edward S. Rogers Sr Professor in the. Dept of Electrical and Computer Engineering at the University of Toronto, and is the Canada Research Chair in Nanotechnology. His book The Dance of Molecules: How Nanotechnology is Changing Our Lives (Penguin) was published in Canada and the US in 2005 and has been translated into French, Spanish, Italian, Korean, and Arabic. He is founder and CTO of *InVisage Technologies, Inc*. He is a Fellow of the AAAS "...for distinguished contributions to the development of solar cells and light sensors based on solution-processed semiconductors." He is a Fellow of the IEEE "... for contributions to colloidal quantum dot optoelectronic devices.


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