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RESEARCH ABSTRACT FORM

TITLE: The Synthesis of Titanate Nanosheets and Applications for Dye-Sensitized Solar Cells

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According to the U.S. Department of Energy, more than 85% of all energy consumed in the U.S.A. is created with non-renewable energy sources. Have you ever wondered what will happen when we lose these sources? To make sure this question is never answered, people all across the world are synthesizing new materials for dye-sensitized solar cells (Gratzel cells). For example, titanate nanosheets created from the exfoliation of a layered protonic-titanate with tetrabutylammonium (hereafter TBA) hydroxide, which resulted in a stable colloidal suspension. Nanosheets are 2-dimensional single crystals, which exhibit physical properties related to their parent molecules. Titanate nanosheets were used as the anode in the solar cell because they provide the greatest surface area per volume obtainable. A larger surface area provides a superior semiconductor for adsorbing dye molecules, because a greater concentration of dye molecules would be adsorbed. A higher concentration of dye molecules corresponds to a greater amount of available light captured by the dye molecules. X-ray diffraction (XRD) is used to analyze and verify the synthesis of the layered cesium titanate, layered protonic-titanate, and titanate nanosheets.