

Plastic Solar Cells Based on Self-Assembled Arrays/Polymer Composites Cahay-ECECS.

Objectives: The objective is to develop self-assembled arrays of CdS quantum dots/polymer composites for use in solar energy conversion.

Approach: The bottom portion of the structure is composed of a self-assembled array of CdS quantum dots fabricated electrochemically. The self-assembled array is then contacted by a bottom metallic contact (rare-earth sulfide), which can be pasted to a flexible substrate via silver epoxy to produce a simple and inexpensive material. It has two clear advantages over traditional nanolithography. First, it is a parallel technique unlike direct write nanolithography, which requires writing patterns on each wafer one at a time (sequentially) thereby resulting in slow throughput. Second, it is a relatively gentle chemical technique that causes little or no processing damage to the finished nanostructures. Figure 9 shows LaS nanodots on alumina templates.

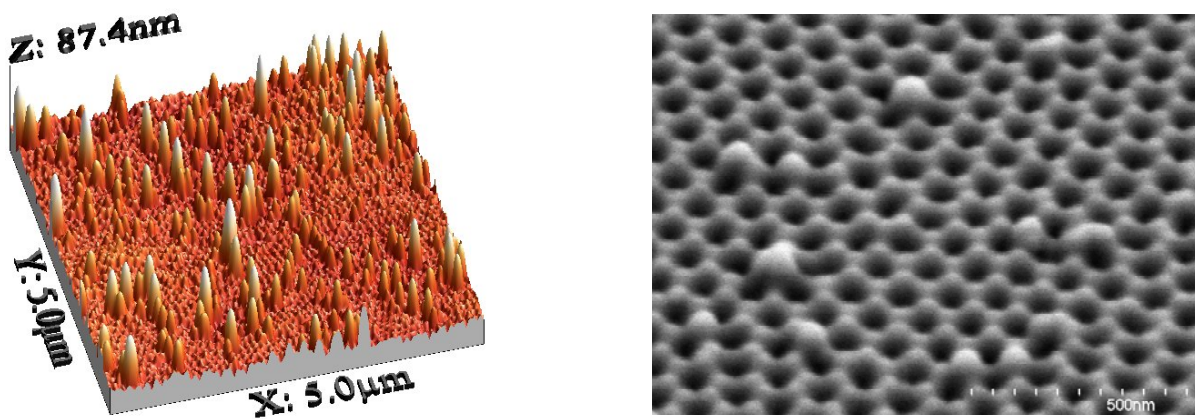


Fig. 9. (Left) AFM scan showing the successful growth of LaS nanodots on the alumina templates. (Right) FE-SEM picture taken at a 60° angle from the substrate clearly showing some of the nanodots. The largest nanodots have a cross-section around 100 nm close to the substrate. The nanodots are either semi-spherical or semi-ellipsoidal in shape.