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Articles

Selective Etching of SnO₂:F Films with a Pulse Programmable Industrial Fiber Laser

2012 MRS Fall Meeting.

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ABSTRACT

In our work on laser scribing CdTe solar cells we have found what appears to be an unpublished laser material interaction that allows precise laser etching of SnO₂ films to an arbitrary thickness with high uniformity. This precise and efficient laser etching mechanism allows arbitrary reduction of the film thickness in a controlled manner on the scale of tens of nm. In addition to the fine depth selection, we find that there develops a pulse duration dependent microstructure on the surface. This micro microstructure results in a strong diffraction effect in the visible portion of the spectrum. In this work we propose a physical mechanism behind this novel depth selective laser interaction as well as the resultant micro-structure. Finally we demonstrate and propose some possible applications for this process.

Key Words:

laser ablation; laser decomposition; laser-induced reaction

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