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# INTERACTION OF LASER PULSES IN LASER SCRIBING PROCESSES FOR APPLICATIONS IN PHOTOVOLTAIC AND ELECTRONIC DEVICES BASED ON CDTE AND CIS

This work presents a study and analysis of laser scribing processes in thin-film semiconductor materials such as SnO2: F, CdTe and CIS, with possible applications in photovoltaic and electronic devices. The process carried out is with an Nd: YAG laser system that operates at a wavelength of 532 nm at a frequency of 50 Hz, the way in which laser scribing is done is with a pulse system mode, where only 1 pulse is emitted at a certain power. Due to the characteristics of the laser system, the only parameter modified for these experiments was the power of the pulses emitted and the number of pulses in each area in each of the materials. With the experimental processes carried out, profiles of each of the damages caused by the laser pulses are obtained in a superficial way, as well as profiles where the width and depth of the same damage is observed in each of the SnO2: F, CdTe and CIS materials. As a result, laser scribing processes are associated with a laser-material interaction in which surface damage is presented in each of the materials, which are associated with the values of power, fluence, energy densities that were used, an analysis is also made regarding the amount of ejected material with respect to the energy used in each of the materials. Other factors that are analyzed are the thermal and stress phenomena present in laser scribing processes. The characterizations that support the results of this work are based on profiles obtained by profilometry, 3D profilometry, optical microscopy, SEM and EDS.

## Keywords

Laser scribing, Thin films, Laser pulse, CdTe

#### Reference

Wang, H., Hsu, S., Tan, H., Yao, Y. L., Chen, H., and Azer, M. N, Predictive Modeling for Glass-Side Laser Scribing of Thin Film Photovoltaic Cells, OCTOBER 2013, Vol. 135 / 051004-1. https://doi.org/10.1115/1.4024818

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#### Author approval

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