

Modulated Electroluminescence for Minority-Carrier Relaxation in HJ-Si and CIGS Cells (PVCORE-2)



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Scientific Achievement:

Relaxation time of minority carriers in solar cells is obtained from the frequency dependence of inphase (A_{in}) and quadrature (A_{quad}) components of modulated electroluminescence (MEL) using standard electrical equipment.

Significance and Impact:

In MEL, the relaxation time is obtained from the frequency at which the quadrature component peaks, independent of a knowledge of material parameters such as mobility. Hence, it can be used for any finished cell that has detectable light emission.

Research Details:

- For silicon solar cells, the relaxation is dominated by recombination and the relaxation time is the minority-carrier lifetime.
- In contrast, for the CIGS solar cells, the relaxation time is dominated by trapping and emission from shallow minority-carrier traps.

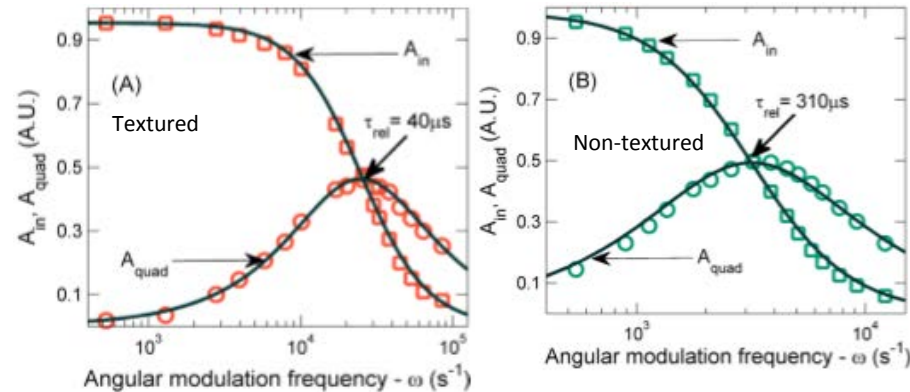


Fig. 1: MEL response of a textured and non-textured HJ-Si solar cell.

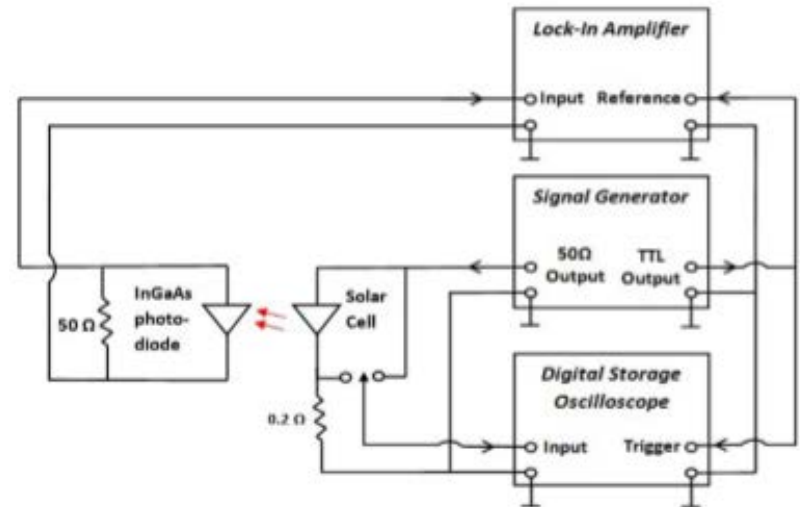


Fig. 2: Schematic of the MEL setup.

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