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Modulation Frequency-Dependence of Photocurrent in Amorphous Si:H p-i-n and Chalcogenides

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Abstract: The effects of modulation frequencies (up to 35 kHz) on the intensity- and temperature-dependence of photocurrent of amorphous (a-) Si:H p-i-n and chalcogenide glasses (a-Se and a-As₂Se₃) were investigated in detail. The variation of exponent n , and in the power-law relationship σ_{ph} or $I_{ph} \propto G^n$ between the photoconductivity (or photocurrent) and the generation flux, with modulation frequency in chalcogenide glasses is found to be much stronger than that of a-Si:H p-i-n. The activation energies, calculated from the temperature-dependent photocurrent, were determined at different modulation frequencies. We conclude that the activation energy increases with increasing modulation frequencies at low excitation intensities. The results are also compared with the predictions of multiple-trapping (MT) and distant-pair (DP) models developed for photoconductivity of a-semiconductors at high and low temperatures, respectively.

 [Keywords](#)

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