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Original Paper

Gettering in silicon photovoltaics: current state and future perspectives

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Abstract

This paper summarizes current understanding and predictive simulations of gettering processes predominantly applied in silicon photovoltaics. Special emphasis is put on various processes limiting gettering efficiency and kinetics, i.e. the mobility of interstitially dissolved metal species, the formation of the gettering layer, and the effect of immobile metal species. The latter are substitutional metal species, precipitates, complexes with defects related to non-metallic impurities, and finally the interaction with extended defects, in particular dislocations. Finally, alternative annealing schemes involving high-temperature rapid thermal processing are explored by simulations. It is shown that a processing window exists for a two-step process efficient for the removal of precipitates even under the constraints of a fixed thermal budget for phosphorus diffusion. (© 2006 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim)

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