

# **Impact of light quantum in Rapid Photothermal Diffusion of Zn IN GaAs**

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## **Abstract**

The experimental results of the Rapid Photothermal Diffusion (RPD) of Zn in GaAs and p-n junction formation, model and role of quantum factor in this process are presented in this paper. The p-n junctions with depth of 0.2-1.2 $\mu\text{m}$  have been obtained by RPD at 600-950 $^{\circ}\text{C}$  for 6-60s diffusion time for solar cells and microelectronic application. The diffusion coefficients and activation energies of the RP-enhanced diffusion at low ( $N_0 < 4 \times 10^{19} \text{ cm}^{-3}$ ) and high ( $N_0 > 1 \times 10^{20} \text{ cm}^{-3}$ ) concentrations of Zn in GaAs were analysed. The activation energy of RP-diffusion is lower than that of the conventional furnace diffusion and diffusion coefficient is higher by 1-2 orders of magnitude. The proposed model and calculated wavelength dependence of RP-diffusion coefficient,  $D(\lambda)$ , are in accordance with experimental results.

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