Improved shallow p^+ diffusion into InGaAsP by a new spin-on diffusion source

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Shallow p^+ diffusion into InGaAsP ($\lambda = 1.3\,\mu$m) has been improved by employing a new spin-on source based on Zn-doped alumina. Thereby the thermal expansion coefficients of diffusion source and semiconductor are better matched together than in case of the more common Zn-doped silica films. Consequently, besides an excellent mechanical stability of the spin-on films over a wide temperature range, the influence of mechanical stress on the diffusion process is effectively reduced. Applying diffusion temperatures around 600 °C surface hole concentrations above 6×10^{19} cm^{-3} and extremely low specific p-contact resistances of $2\text{–}3\times10^{-6}\ \Omega$ cm^2 have been achieved.