

Abstract Submitted
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Sodium acceptor doping of ZnO crystals¹ NARENDRA PARMAR, KELVIN LYNN, Washington State university — ZnO bulk single crystals were doped with sodium by thermal diffusion. Positron annihilations spectroscopy was employed to confirm the filling of zinc vacancies, to $>6 \mu\text{m}$ deep in the bulk. SIMS measurement shows the diffusion of sodium up to $8 \mu\text{m}$ with concentration $(1 - 3.5) \times 10^{17} \text{ cm}^{-3}$. Broad photoluminescence excitation peak at 3.1 eV, with onset appearance at 3.15 eV in Na:ZnO is attributed to an electronic transition from a Na_{Zn} level at $\sim (220 - 270) \text{ meV}$ to the conduction band. For electrical measurements, Ohmic contacts were made using a MoO_2 solution (ethyl glycol: H_2O :: 60:40) on a hot plate at $200 \text{ }^\circ\text{C}$ for 10 min. MoO_2 has a work function of 6.5 eV and can be useful for electrical Ohmic contacts for wide band gap semiconductors. Resistivity in Na doped ZnO crystals increases up to (4 — 5) orders of magnitude at room temperature.

[1] N. S. Parmar and K. G. Lynn, *Applied Physics Letters* **106**, 022101 (2015).

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