COLIBABA, G. Sintering highly conductive ZnO:CHl ceramics by means of chemical vapor transport reactions. In: Ceramics International. 2019, Vol. 45, Issue 13, pp. 15843-15848. ISSN 0272-8842.

The features of sintering ZnO ceramics by means of chemical vapor transport (CVT) in sealed quartz chambers were investigated. CO, C, H_2, HCl, HCl + H_2, HCl + C, HCl + Zn and HCl + H_2+ C mixtures were used as transport agents (TAs) at the 925–1070 °C temperature range. The exact thermodynamic analysis of compound CVT systems, carried out for wide temperature and loaded TA pressure ranges, was applied to establish the relation between medium composition and the characteristics of sintered materials. The advantages of some compound TAs based on HCl were shown. ZnO:HCl ceramics with a diameter of 25 mm (99 ± 1% of the initial diameter of the sintering powder), a density of 5.1 ± 0.3 g/cm^3, a hardness of 2.0 ± 0.2 GPa, a resistivity of $2.4 \cdot 10^{-2}$ Ω cm, and a controllable stoichiometric deviation, were obtained. The investigated materials have no contamination from metallic Zn, $ZnCl_2$ or solid C. The doping efficiency of ZnO ceramics by oxides of various metals, by means of low temperature CVT reactions with $ZnCl_2$ vapors as a TA, was calculated for oxides of all non-radioactive metals of the periodic table.