

p-T-x phase diagram of the ZnO–FeO system: experimental and theoretical studies

P.S. Sokolov¹, A.N. Baranov², V.Z. Turkevich³, V.L. Solozhenko^{1*}

¹ LSPM–CNRS, Université Paris Nord, Villetaneuse, France

² Department of Chemistry, Moscow State University, Moscow, Russia

³ Institute for Superhard Materials of the National Academy of Science of Ukraine, Kiev, Ukraine

Experimental *in situ* study of chemical interaction and phase relations in the ZnO–FeO system at high pressures and temperatures using X-ray diffraction with synchrotron radiation [1-2] allowed us to calculate phase equilibria in the system and construct isobaric cross-sections of the equilibrium *p-T-x* phase diagram at pressures up to 7 GPa (Fig. 1).

With the pressure increase, the *T-x* phase diagram changes from peritectic (Fig. 1a) to eutectic type (Fig. 1b), and further to the diagram with unlimited solubility in both liquid and solid phases (Fig. 1c-d). The similar behavior can be expected for other binary oxide systems i.e. ZnO–MgO, ZnO–NiO, ZnO–CoO and ZnO–MnO due to stabilization of rock-salt ZnO under pressure.

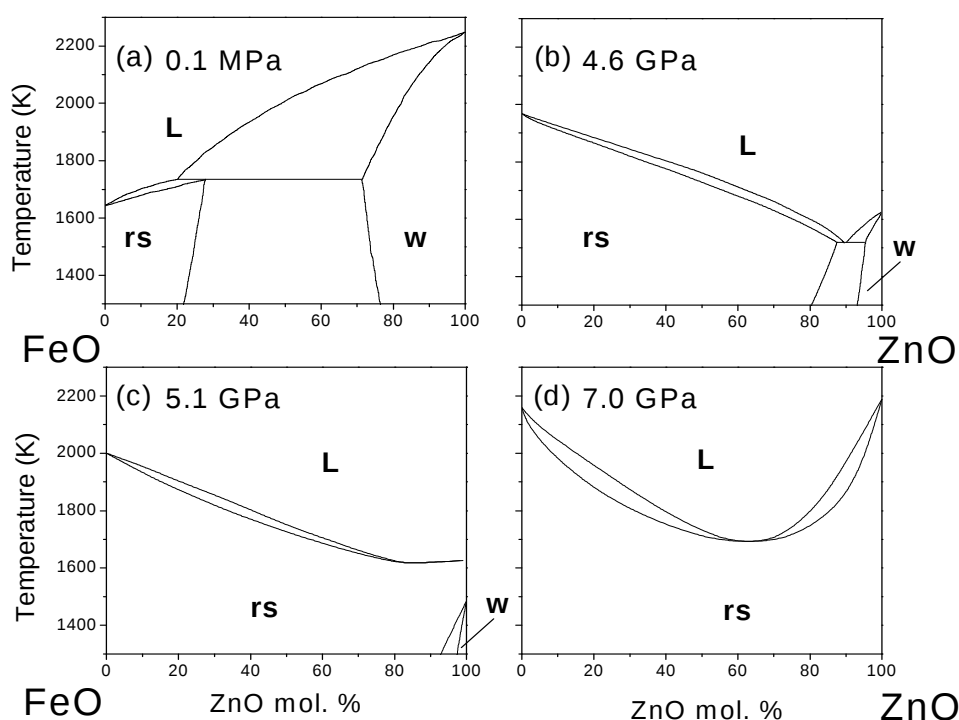


Fig. 1. Isobaric cross-sections of the equilibrium *p-T-x* phase diagram of the ZnO–FeO system at ambient [3] (a) and high (b-d) pressures.

1. P. S. Sokolov, PhD Thesis, Univ. Paris 13, 2010.
2. P. S. Sokolov, A. N. Baranov, C. Lathe, and V. L. Solozhenko, *High Pressure Res.* **30**, 39 (2010).
3. S. A. Degterov, E. Jak, P. C. Hayes, and A. D. Pelton, *Metall. Mater. Trans. B*, **32**, 643 (2001).

*Corresponding author: vladimir.solozhenko@univ-paris13.fr

Keywords: zinc oxide, iron (II) oxide, high pressure, high temperature, phase diagram