solution (x = 0.14; 0.29; 0.43) are established in the temperature range 1220–1305°C. It is shown that in the reaction zone of interacting NiO, (Ni, Zn)O, or ZnO with Fe<sub>2</sub>O<sub>3</sub> the ferrite phase crystallizes only on iron oxide. The distribution of the Fe, Ni, and Zn concentrations over the reaction layer thickness using electron probe and X-ray spectrum analysis is obtained. The interdiffusion coefficients over the investigated temperature range calculated in the (Ni, Zn, Fe)O and ferrite phases change from (0.8– 7.0) × 10<sup>-9</sup> to (1.0–12.0) × 10<sup>-10</sup> cm<sup>2</sup>/sec, respectively. The interaction of (Ni, Zn)O with Fe<sub>2</sub>O<sub>3</sub> takes place by the mechanism of interaction of interdiffusion of Fe<sup>3+</sup>, Fe<sup>2+</sup>, and Ni<sup>2+</sup>, Zn<sup>2+</sup> along with a current of Zn<sup>2+</sup> ions and electrons or oxygen ions directed to the ferrite/Fe<sub>2</sub>O<sub>3</sub> interface.

Phase Equilibrium Relations in the Binary systems  $LiPO_3-CeP_3O_9$  and  $NaPO_3-CeP_3O_9$ . M. RZAIGUI AND N. KBIR ARIGUIB,\* Laboratoire de Physico-Chimie Minérale, Ecole Normale Supérieure, 43, Rue de la Liberté, Le Bardo, Tunis. The  $LiPO_3-CeP_3O_9$  and  $NaPO_3-CeP_3O_9$  systems have been investigated for the first time by DTA, X-ray diffraction, and infrared spectroscopy. Each system forms a single 1: 1 compound. LiCe(PO\_3)\_4 melts in a peritectic reaction at 980°C. NaCe(PO\_3)\_4 melts incongruently, too, at 865°C. These compounds have a monoclinic unit cell with the parameters: a = 16.415(6), b = 7.042(6), c = 9.772(7) Å,  $\beta = 126.03(5)^\circ$ , Z = 4, space group C2/c for LiCe(PO\_3)\_4 and a = 9.981(4), b = 13.129(6), c = 7.226(5) Å,  $\beta = 89.93(4)^\circ$ , Z = 4, space group  $P2_1/n$  for NaCe(PO\_3)\_4. It is established that both compounds are mixed polyphosphates with chain structure of the type |M|  $M_{\rm H}^{\rm HI}$  (PO<sub>3</sub>)\_4|\_{\infty}  $M_{\rm H}^{\rm H}$  alkali metal,  $M_{\rm H}^{\rm HI}$  rare earth.

Phase Relations in the Ternary W-Mo-O System. T. EKSTRÖM, E. SALJE, AND R. J. D. TILLEY, School of Materials Science, University of Bradford, Bradford BD7 1DP, West Yorkshire, United Kingdom. The phases in the ternary W-Mo-O system have been determined using X-ray diffraction and electron microscopy. Series of mixed crystals occur for the fully oxidized compounds  $W_xMo_{1-x}O_3$ . Slightly reduced crystalline samples consist of CS phases containing {102} CS planes which are ordered when the Mo content is high. These latter have overall compositions  $(W_xMo_{1-x})_n$  $O_{3n-1}$ , with *n* increasing with increasing W-content from 9 to 16. More substantially reduced crystals show less tendency to form mixed crystals. In samples of overall composition near to  $M O_{2.90}$  phase separation occurs into {102}-containing CS phases which are molybdenum rich and {103} CS phases which are tungsten rich. The tungsten oxides WO<sub>2.82</sub> and W<sub>18</sub>O<sub>49</sub> seem to contain little or no Mo. These results are summarized in a phase diagram.

The Structure of Cubic YbZrF<sub>7</sub>. M. POULAIN AND B. C. TOFIELD,\* Materials Development Division, AERE Harwell, Oxon, OXII ORA, United Kingdom. The structure of primitive-cubic YbZrF<sub>7</sub> has been determined using X-ray and neutron diffraction techniques. A unit cell (a = 4.07 Å, space group Pm3m) contains one formula unit of Yb<sub>0.5</sub>Zr<sub>0.5</sub>F<sub>3.5</sub>, with no ordering of cations, in materials prepared by rapid quenching from 1000°C. Metal and fluorine displacements from ideal sites are in accord with results previously obtained on Zr<sub>0.8</sub>Yb<sub>0.2</sub>F<sub>3.2</sub>O<sub>0.5</sub>. The separation between F-F pairs bridging neighboring metal ions is similar to those observed in other complex zirconium fluorides. The metal displacements, metal-fluorine distances and fluorine-fluorine distances are discussed with respect to the formation and stability of disordered fluorine-excess ReO<sub>3</sub>-type phases. These materials are intermediate in character between phases such as monoclinic YbZrF<sub>7</sub>, with perfect order on both metal and nonmetal sublattices, and ZrF<sub>4</sub>-based glasses, where there is disorder on the metal as well as on the fluorine sublattice. No ordering effects are observed on heating to near 200°C, but near 400°C there is a slow transformation to the monoclinic YbZrF<sub>7</sub> structure.