confirmed by experiments in a belt-type apparatus in the range 15–80 kbar and 500–1200°C. For *Ln* = La, Ce, Pr, Nd, Sm, a face-centered cubic compound is obtained from each reaction. The cell parameters are respectively 5.144, 5.089, 5.031, 4.994, and 4.943 ± 0.005 Å. The compounds appear golden yellow with a metallic luster. From chemical analyses and cell parameter considerations it is concluded that these compounds are the rare earth monoxides. For *Ln* = Gd, Dy, Tm, no reaction is observed at 50 kbar and 1000°C. The rare earth monoxides show a variety of properties: LaO, CeO, PrO, and NdO are metallic with the rare earth in the trivalent state; EuO and YbO are semiconductors with the rare earth in the divalent state; SmO is metallic with samarium in an intermediate valence state close to 3.

An Electron Microscope Study on Substitutional Order and Disorder in the System MnS-Ln_2S_3 (Ln = Yb or Y). M. Bakker and C. M. Plug, Gorlaeus Laboratories, State University, P.O. Box 9502, 2300 RA Leiden, The Netherlands. The substitution of 2 Ln^{3+} (*Ln* is Yb or Y) for 3 Mn^{2+} at about 1873 K in the α-MnS structure (ccp) was investigated by means of electron diffraction (at room temperature). Diffuse intensity contours suggest that cuboctahedral clusters of Mn^{2+} and Ln^{3+} around a vacancy are formed. In the close-packed plane, the cluster is a hexagon of 4 Mn^{2+} and 2 Ln^{3+} around a vacnacy, a seven-point cluster. Clusters remain independent up to composition 4 MnS · Ln_2S_3. With higher Yb_2S_3 content spinel domains in the S.R.O. matrix are formed. Samples MnS–Y_2S_3 heated at 1873 K showed formation of extended defects (in this case twin planes) when they contained more than 20 mole% Y_2S_3 (14% vacancies).

Synthesis of New Luminescent Materials Activated with Divalent Samarium. A. Gros, F. Gaume, and J. C. Gâcon*, Université Lyon I, 43 Bd du 11 Novembre 1918, 69622 Villeurbanne, France. A simple technique for the preparation of powder compounds doped with divalent samarium is described. The reaction is carried out in nickel containers sealed in an inert atmosphere. The samarium impurity is introduced as samarium trifluoride SmF_3 and metallic samarium powder acts as the reducing agent to change Sm^{3+} into Sm^{2+}. Using this method, samarium has been stabilized in the divalent state in various fluorides: $KMgF_3$, $BaLiF_3$, BaY_2F_8, and KY_3F_{10}. The resulting compounds show under ultraviolet or visible excitation an intense luminescence in the red region characteristic of Sm^{2+}-doped materials. The emission and excitation spectra of these phosphors are presented and briefly discussed.