$$\left[\frac{N_A \rho_1}{N_{s1} \exp\left(\frac{Q_s}{2kT_1}\right)}\right] = A_M + A_O$$

And, solving this expression for A_M gives

$$A_M = \left[\frac{N_A \rho_1}{N_{s1} \exp\left(\frac{Q_s}{2kT_1}\right)}\right] - A_O$$

Now, assuming that T_1 = 750°C, the value of A_M is

$$A_M = \left\{\frac{(6.023 \times 10^{23}\ \text{ions/mol})(3.50\ \text{g/cm}^3)(10^6\ \text{cm}^3/\text{m}^3)}{(5.7 \times 10^9\ \text{ions/m}^3)\exp\left[\frac{7.7\ \text{eV}}{(2)(8.62 \times 10^{-5}\ \text{eV/K})(750 + 273\ \text{K})}\right]}\right\} - 16.00\ \text{g/mol}$$

$$= 24.45\ \text{g/mol}$$

Upon consultation of the periodic table in Figure 2.6, the divalent metal (i.e., that forms M^{2+} ions) that has an atomic weight closest to 24.45 g/mol is magnesium. Thus, this metal oxide is MgO.