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Structure and oxygen storage/release capacities of $Dy_{1-x}Y_xMnO_{3+\delta}$ ($0 \leq x \leq 1$)[1]

S. REMSEN, B. DABROWSKI, O. CHMAISSEM, S. KOLESNIK, J. MAIS, Department of Physics, Northern Illinois University, DeKalb, IL 60115 — Synthesis, oxygen storage/release capacities (OSC), oxygen absorption/desorption rates, and structural properties of $Dy_{1-x}Y_xMnO_{3+\delta}$ ($0 \leq x \leq 1$) have been studied by x-ray and neutron powder diffraction, dilatometry, and thermogravimetric analysis. These materials have been found to have excellent reversible OSC at low-temperatures of 200 - 375 $^\circ$C and various oxygen partial-pressures, making them potential candidates for oxygen sorbents in novel gas separation methods such as thermal swing absorption and thermal-automatic recovery processes. The OSC of the $Dy_{1-x}Y_xMnO_{3+\delta}$ system relies on the difference in oxygen content of a reversible phase transitions between hexagonal P63cm ($\delta = 0$) and a previously unreported stable phases of this system ($0 < \delta < 0.5$) and pyrochlore Fd3m [$\delta = 0.50$, Subramanian *et al.* J. Solid State Chem. **72,** 24 (1988)].

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