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Synthesis, $P-T$ phase diagram, and T_c of $R_2Ba_4Cu_7O_{15}$ (R= Dy,Y, DyY, GdY)[1] SEYED AHMAD SABOK-SAYR, BOGDAN DABROWSKI, STANISLAW KOLESNIK, Department of Physics, Northern Illinois University — The oxygen pressure - temperature phase diagrams of $R_2Ba_4Cu_{15}$ (R=Dy,Y, Er, DyY, GdY, and EuY) superconductors have been investigated in the temperature range between 850 and $1025°C$ and the pressure range between 1 and $50\,atm.O_2$. The relative fraction of the phases: 123, 124, and 247, was determined by studying the intensity of the xray diffraction peaks of each phase. The condition at which the phase pure 247 exists was determined to be $P = 10\ atm$ and $T = 1025°C$. Under these conditions samples with larger size R = LaY, NdY, SmY, and Eu fail to form pure 247 phase. Annealing at $P = 200\ atm.O_2$ and $400°C$ was used to increase oxygen content of the as-synthesized materials and to induce superconductivity. The highest transition temperatures of $70K$ were observed for R=Y compositions.

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