Y_2O_3-$Y(Cr_xMn_{1-x})O_3$ NTC ceramics resistors

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Previous studies[1] have shown the opportunity to obtain high temperature sensors with compounds from the ternary diagram Y_2O_3-Mn_2O_3-Cr_2O_3. This NTC resistors are two phased with an high resistive phase Y_2O_3 and a less resistive orthorhombic phase $Y(Cr,Mn)O_3$. The present study is devoted to the compositions $0,6Y_2O_3–0,4Y(Cr_xMn_{1-x})O_3$ with $0<x<1$. Dense ceramics sintered at 1600°C.

When x is ranging to 0,3 to 0,9, resistivities at room temperature, are continuously ranging from 10^5 to 6 10^8 Ω.cm together with B coefficients ranging from 3400 to 5600K, when resistance versus temperature is classically expressed as $R=a \exp(B/T)$.

Structure and microstructure have been investigated by DRX and MEB observations. When $x>0,3$, ceramics are two phased with an Y_2O_3 phase and an $Y(Cr,Mn)O_3$ phase: a solid solution of Mn in an $YCrO_3$ phase. The cell parameters have been calculated and the cell volume decreases continuously when x increases. When $x\leq0,3$ a third phase isomorph at $YMnO_3$ is observed.

[1] Houivet D., Bernard J., Haussonne J.M., “High temperature NTC ceramics resistors (ambient-1000°C)”, J. Eur. Ceram. Soc., 24, pp 1237-1241, 2004