

Effect of composition on electrical and humidity sensing properties of NiO:MnO₂:CuO solid mixture

Crystal Y. Wilson^a and S. Manivannan^{b*}

^aDepartment of Chemistry, Anna Adharsh College for Women, Chennai-600 040, India

^bP.G. & Research Department of Chemistry, Dr. Ambedkar Government Arts College, Chennai-600 039, India

E-mail: sembanuran@gmail.com

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The ternary solid mixture of transition metal oxides [nickel(II), manganese(IV) and copper(II)] NMC were prepared with different mole ratios of their component oxides and sintered at 850 K in the form of cylindrical disks. The humidity sensing is described by experimental results on NMC. The transition metal oxide mixtures were subjected to dc resistance measurement as a function of relative humidity in the range of 5–98% RH, achieved by different water vapour buffers thermo stated at room temperature. The sensitivity factor ($S_f = R_{5\%}/R_{98\%}$) measured at 298 K revealed that NMC-121 metal oxide mixture has the highest humidity sensitivity factor 2705. The sample having highest sensitivity factor NMC-121 is characterized by powder XRD and FT-IR data. The same has been subjected to dc conductance measurements in the temperature range from 318 K to 623 K and hence the activation energy is calculated. The activation energy value was found to be 0.327 eV. These ternary solid mixtures of transition metal oxides can be used as commercial thick film humidity sensor because of their humidity sensing factors.

Keywords: Sensor, humidity, transition metal oxides, dc resistance, sensitivity.