

# Effect of $V_2O_5$ on The Sintering Behaviour, Cation Order and Properties of $Ba_3Co_{0.7}Zn_{0.3}Nb_2O_9$ Ceramics

F. Azough, C. Leach and R. Freer

Manchester Materials Science Centre, UMIST & University of Manchester,  
Manchester, M1 7HS, UK

## Abstract.

The microstructures and microwave dielectric properties of barium cobalt zinc niobate ceramics prepared by conventional mixed oxide route have been investigated. It was found that low levels doping of  $V_2O_5$  (up to 0.2 wt% ) can significantly improve densification of the specimens and their properties. Dielectric properties of  $V_2O_5$  doped samples were affected by 1:2 ordering in the B-site. Slow cooling after sintering or annealing in a nitrogen atmosphere improved the unloaded quality factor (Q.f values) significantly. The  $Ba_3Co_{0.7}Zn_{0.3}Nb_2O_9$  (BCZN) ceramics exhibited  $\epsilon_r = 34.5$ ,  $\tau_f = 0$  ppm/C and  $Q.f = 85000$  at 4GHz.