

**Aran Rafferty\***, **Yurii Gun'ko**

Chemistry Dept., University of Dublin, Trinity College,  
College Green, Dublin 2.

**An investigation of co-fired varistor-ferrite materials prepared using dry-pressing and screen-printing technologies.**

**Abstract**

The purpose of this work was to co-fire varistor-ferrite ceramic multilayers fabricated via two routes: dry pressing, and screen-printing. Sinter shrinkage of the varistor and ferrite materials were measured using dilatometry and showed that the varistor shrunk significantly more than the ferrite material. XRD analysis indicated that no significant phase changes occurred in the materials as a result of the sintering process. SEM observations of the dry-pressed co-fired varistor-ferrite revealed vertical cracking in the ferrite due to thermal expansion mismatch between the materials. By pressing a mixed composition interlayer in the ratio 50:50, between the varistor and ferrite materials, a crack-free multilayer structure was obtained. EDX analysis of the co-fired ferrite and varistor confirmed diffusion of Fe and Ni components from the ferrite into the varistor material. The presence of the mixed composition interlayer hindered diffusion between layers. Crack-free varistor-ferrite multilayers were also fabricated via a wet-stack screen-printing process, and these results compare favourably with the dry-pressed samples.

[Key words: dry-pressing, varistor, ferrite, shrinkage, diffusion.]

Corresponding Author

E-mail address: aran.rafferty@dcu.ie

---