Influence of ZnO Nanofillers on the Permittivity of New Cold-Curing Class Polyurethanes

Štefan Hardoň[1, a)], Jozef Kúdelčík[1, b)], Peter Hockicko[1, c)], Jaroslav Hornak[2, d)] and Miroslav Zahoran[3, e)]

[1)]*Department of Physics, Faculty of Electrical Engineering and Information Technology, University of Žilina, Univerzitná 12, 010 26 Žilina, Slovak Republic*
[2)]*Department of Technologies and Measurement, Faculty, of Electrical Engineering, University of West Bohemia, Univerzitní 26, 301 00 Pilsen, Czech Republic*
[3)] *Dept. of Experimental Physics, Comenius University, Mlynská dolina F2, 84248 Bratislava, Slovak Republic*

[a)] Corresponding author: stefan.hardon@uniza.sk

Abstract. An important group of polymers with a wide range of applications is polyurethanes (PUR). In this contribution two-component system (2K PUR) is used to describe the effect of filler ZnO (Zinc Oxide) on the dielectric properties of industrial polyurethane marked as VUKOL N22 (from VUKI a.s.). From the results of the investigations carried out, it is evident that the incorporation of ZnO a decrease of real permittivity was observed due to a lower mobility of polymer chains connected to nanoparticles. Lower dielectric losses are associated with the lower relative permittivity. The SEM pictures show the distribution nanoparticles in matrix. Temperature-related relaxation peaks were observed in dissipation factor frequency spectra. Scanning Electron Microscopy (SEM) was used to measure the size and distribution of dispersed particles, and Energy Dispersive X-ray (EDX) analysis was used to confirm the chemical nature of particles.