Title (7)	:	**Dielectric, Mechanical, and Thermal Properties of Crosslinked Polyethylene Nanocomposite with Hybrid Nanofillers**
Journal	:	Polymers 2023, 15(7), 1702
Document Type	:	Article
Publisher	:	MDPI
UniKL Author	:	Muzafar Zulkifli
Link to Full Text	:	https://www.mdpi.com/2073-4360/15/7/1702
Link to Scopus Preview	:	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85152859565&doi=10.3390%2fpolym15071702&partnerID=40&md5=47d93f1880077a2e6e47d75b22db607d
Abstract	:	Crosslinked polyethylene (XLPE) nanocomposite has superior insulation performance due to its excellent dielectric, mechanical, and thermal properties. The incorporation of nano-sized fillers drastically improved these properties in XLPE matrix due to the reinforcing effect of interfacial region between the XLPE–nanofillers. Good interfacial strength can be further improved by introducing a hybrid system nanofiller as a result of synergistic interaction between the nanofiller relative to a single filler system. Another factor affecting interfacial strength is the amount of hybrid nanofiller. Therefore, the incorporation amount of hybridising layered double hydroxide (LDH) with aluminium oxide (Al2O3) nanofiller into the XLPE matrix was investigated. Herein, the influence of hybrid nanofiller content and the 1:1 ratio of LDH to Al2O3 on the dielectric, mechanical, and thermal properties of the nanocomposite was studied. The structure and morphology of the XLPE/LDH-Al2O3 nanocomposites revealed that the hybridisation of nanofiller improved the dispersion state. The dielectric, mechanical, and thermal properties, including partial discharge resistance, AC breakdown strength, and tensile properties (tensile strength, Young's modulus, and elongation at break) were enhanced since it was influenced by the synergetic effect of the LDH-Al2O3 nanofiller. These properties were increased at optimal value of 0.8 wt.% before decreasing with increasing hybrid nanofiller. It was found that the value of PD magnitude improvement went down to 47.8% and AC breakdown strength increased by 15.6% as compared to pure XLPE.