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NOVEL THERMOPLASTIC BASED SUBSTRATES FOR PRINTED CIRCUIT BOARDS

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Lately, high temperature (HT) thermoplastic substrates for printed circuit boards have been gaining growing interest as an advantageous alternative to commercially available substrates based on glass fiber reinforced epoxy. HT thermoplastic substrates are inherent flame-resistance and fulfil UL-V0 status, and therefore do not require brominated flame-retardants as employed in epoxy substrates. Moreover thermoplastic-based substrates can be recycled, three-dimensional thermally shaped and manufactured via extrusion or injection-moulding, offering economic advantages. This work focuses on the development of two different types of thermoplastic substrates for printed circuit boards, a foamed and a highly filled polyetherimide (PEI). Regarding the foamed substrate, talc is melt-compounded in PEI (2 + 5 weight %) using a twin-screw extruder. Foamed samples are afterwards prepared by foam extrusion using CO_2 as physical blowing agent. The second type is also based on PEI, which is highly filled with talc (up to 35 vol.%). Specimens were produced using a twin screw extruder as also an injection molding machine. The aim of this study is to show the recent developments of these innovative thermoplastic substrates and more precisely analyzing the influence of talc on the morphology, as well on the electrical and thermal properties. Talc shows a positive influence on the foam morphology, as well on the thermal expansion behavior, the water absorption and the dielectric properties of the highly filled PEI.