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Soft, hyper-elastic and highly-stable silicone-organo-clay dielectric elastomer for energy harvesting and actuation applications

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Abstract:

A new type of soft composite is archived by the use of two grade of commercially available Pt-catalyzed silicone elastomers and organic nanoclays (montmorillonite). A complete characterization underlines their attractive performances: lower Young modulus, higher dielectric permittivity, but without compromising important properties such as low dielectric losses and lower viscous losses, higher dielectric breakdown strength, and thereby maintaining the mechanical integrity of the elastomers. A figure of merit is introduced to compare all the innovative synthesized soft composites, characterized by a bimodal network. These achievements can be exploited for both the actuation and the energy generation purposes.

Keywords: A. Polymer-matrix composites (PMCs); A. Smart materials; B. Mechanical properties; B. Electrical properties.

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