Elastomers and Applications

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The project is a theoretical and experimental study of electro sensitive elastomers, more specifically polydimethylsiloxane, which is concretized in a comparison of polymers based on polydimethylsiloxane with various contents and applications in the field of energy harvesting and electromechanical actuator for robotics and medicine. The main idea of the project is to make a comparison of polymers based on polydimethylsiloxane (we choose specifically these type of active polymer because is cheap, easy to manufacture and it have great mechanical properties) with various contents and to find the best applications for these polymers in the fields of energy harvesting (ex: energy from waves ; energy from lost vibration on the walls; etc.) and medicine and robotics (artificial muscles). For the applications in the field of energy harvesting we test different structures that can amplify the quantity of energy that can be converted from vibration to electrical energy. Regarding the applications for electromechanical actuation in medicine and robotics, more specifically artificial muscles, the main problem is the high voltage the polymers need to change their form so we are testing very thin multilayer polymers with special rubber carbon nanotubes electrons to lower the voltage and increase the mechanical power.