

Bioinspired Design of green soft robots

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Nature uses a design approach based on soft materials: “nature uses soft material frequently and hard materials sparingly”. Evolutionism has generated flexible structures capable of interacting naturally with the environment and adapting to unplanned situations. The bioinspired evolution of technical system is following the same pattern so dynamization, life cycle, macro-micro, asymmetry and scaling up or down affects robot. Soft robotics, an emerging engineering discipline, has introduced a paradigm shift in the construction of robots, by introducing flexible and bioinspired elements into the mechanical structure of robotic systems. Design for soft robotics is the emerging mechanical engineering discipline that has the aim to generate concepts, define functions and architectures, parameter design and assembly and prototype of skilled and flexible structures, capable of adapting their shape to the environment and to tasks for which the robot was not programmed. In soft robotics there is no clear difference between body, actuator and controller. Soft robots are intrinsically safe in human interaction and are potentially more sustainable than hard ones. To this end a green design approach has to be defined and adopted starting from the definition of the requirements of innovative bioinspired materials as building block of this technology platform. An overview on first results and trends on green soft robotics is presented.