



ISTITUTO ITALIANO  
DI TECNOLOGIA

## TITLE

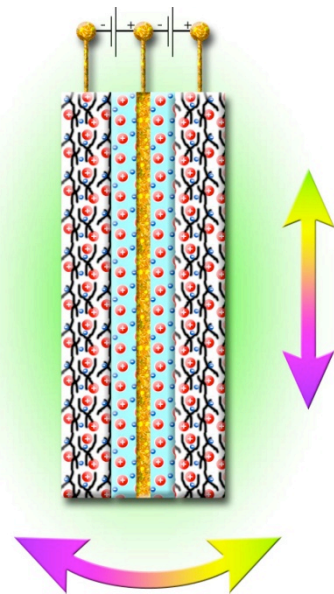
Linear bending polymeric actuator

## INVENTORS

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## DESCRIPTION

The Robotics, Brain and Cognitive Sciences research group, has developed a new low voltage polymeric actuator that, in contrast with present day devices which are typically capable only of bending motion, can deliver linear, bending or simultaneous linear/bending motion. This actuator comprises three electrodes and a solid electrolyte. Two electrodes are made of active materials that contract or expand as result of charge injection (ex. carbon nanotubes) or conducting polymer (ex. polypyrrole, polyaniline, polyethylene dioxythiophene, poly 3-methylthiophene etc.). One electrode is passive and acts as counter electrode and is made of conductive flexible materials (ex. a metal spring, conductive fabric, carbon plastic composites) in order to allow the motion of the actuator device. The solid electrolyte is a ionic conductive and electrical insulator and is made of a salt embedded in a polymeric matrix (ex. an ionic liquid in a PVdF matrix or poly(methyl methacrylate), polyethylene oxide, polyacrylonitrile, etc.).



## APPLICATIONS

As the device is lightweight, operates at low voltage and by appropriate polarization can deliver linear, bending or simultaneous linear/bending motion, it finds application in numerous fields of technology as medicals (biomedical devices, rehabilitation equipment, surgical elements), electronics (mobile type tactile displays, pin displays, Braille displays), micromechanics and robotics (micropositioners, free-running small-sized robots, conveying system utilizing a ciliary movements).

## KEYWORDS

actuator, linear, bending, three terminals, carbon nanotubes, conducting polymers, electrolyte

## BIBLIOGRAPHIC DATA TO2010A000548

Attuatore polimerico lineare e flessionale, a tre elettrodi

Application Number TO2010A000548, WO/2011/161651

Priority Date June 25, 2010

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