

## عنوان مقاله:

Fabrication of Carbon Electrodes- based IPMC Soft Actuators and Enhanced Actuation Performance

## محل انتشار:

دومین کنفرانس بین المللی یافته های نوین پژوهشی در شیمی و مهندسی شیمی (سال: 1395)

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## خلاصه مقاله:

Nafion-based ionic polymer-metal composites (IPMCs) soft actuators are interesting materials for application in robotics and in medicine. Platinum electrodes on the conventional IPMC actuators have serious drawbacks of rigidity and high cost. In the current work, Nafion based ionic polymer metal composite (IPMC) actuator was fabricated with different concentrations carbon ink of Vulcan XC-72R carbon and multi walled carbon nanotube (V60My) as electrode thus avoiding the costly and time consuming platinum coating process. After preparing of V60My ink with ultra sonication, the ink was sprayed physically on both side of the pretreated Nafion membrane, forming a trilayer bending actuator. The carbon outer layers improved actuation and increased the conductivity along the sprayed Nafion. The effect of carbon ink with different concentrations was followed using physicochemical, electrochemical and electromechanical measurements. Dramatic changes in the water uptake potential (WUP), ion exchange capacity (IEC), proton conductivity and tip displacement of the prepared IPMC actuators with various percentages of MWCNT was observed due to the formation of high capacitance electrode structure. The highest capacitance electrode structure was formed in actuator synthesized with 40wt. % of MWCNT in prepared ink. The results showed that the displacement of IPMC synthesized with 20wt. % of MWCNT was 36 mm which 1.8 times greater than the conventional Nafion- based IPMC actuators (23 mm) with Pt electrodes.

## کلمات کلیدی:

Ionic polymer metal composites (IPMCs), Soft Actuators, Vulcan XC-72R carbon, MWCNT, Tip displacement

## لینک ثابت مقاله در پایگاه سیویلیکا:

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