Electrical behavior of IPMC membrane

Claudia Bonomo
Dipartimento di Ingegneria Elettrica, Elettronica e dei Sistemi
Università degli Studi di Catania-Italy

The work shows the results of the analysis performed on the electric behavior of a membrane of Ionic Polymer-Metal Composites (IPMC). These new materials have both actuator and sensor characteristics and they are stimulating a growing interest in many fields of research because of their similarity with biological muscles; indeed they are very light and able to generate soft movement and this is the reason why they have been named "Artificial Muscle".
The deformation of the material is activate by a voltage stimulus, vice versa bending the IPMC a voltage can be sensed across its thickness.
The physics of the IPMC and the current terms that play an important role in order to explain its behavior as actuator are presented. Measurements have been executed to model a strip of IPMC by an equivalent impedance. A comparison between experimental data and simulations of the obtained model has been performed and shown.