MICROPRINTING OF ELECTRODES

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In electronic industry there is a trend to go smaller and to accommodate more modules in one single device. Main problems for small electrical devices are bound with relatively complicated rotary parts where conventional apparatus cannot be made small enough. Micro electroactive polymers could be used instead (micro-EAPs). EAPs are typically layered composite materials that use voltage driven ion migration to produce linear or bending displacement while using relatively small driving potential (0.6-5 V). So far the conventional methods for fabricating such materials are based on material wastefulness and multi-step processes (spin-coating, photolithography[1]), which in some cases can be replaced by micro printing[2], where material is deposited exactly where needed and exactly as much as needed.

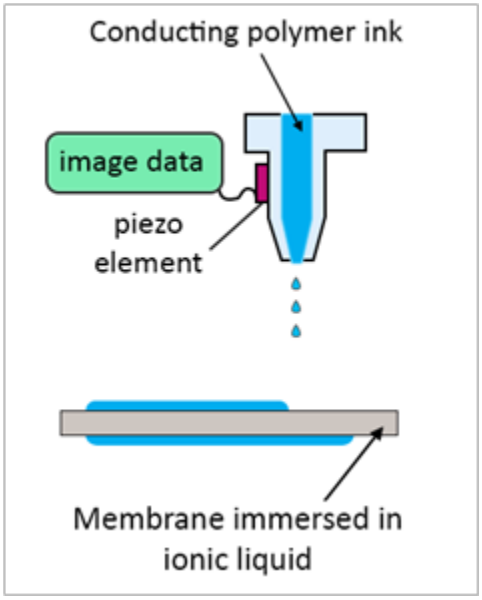

Figure 1 Actuator fabrication mechanism using microprinting

This work introduces micro-EAP fabrication applying microprinting technology. Research focus is on controlled deposition of the conducting polymer on both sides of the ion-conducting membrane poly(vinylidenefluoride) (PVdF) immersed in ionic liquid (Figure 1). The actuation properties were analysed with a laser displacement meter and the deposited films studied under scanning electron microscopy. Electrochemical properties were analysed based on cyclic voltammograms.

References

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[2] A. Simaite, F. Mesnilgrente, B. Tondu, P. Souères, and C. Bergaud, "Towards inkjet printable conducting polymer artificial muscles," *Sensors Actuators, B Chem.*, vol. 229, pp. 425–433, Jun. 2016.

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