

# **TOWARDS A NEW GAS SENSOR MICROSYSTEM USING ELECTROACTIVE POLYMERS THIN FILMS**

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**Abstract-** This paper describes the development of a new gas sensor device using some electroactive polymers in thin layers. The poly(fluoro-aluminium phthalocyanine) powder, (AlPcF)<sub>n</sub>, has been synthesized, then deposited by vacuum evaporation on alumina or silicon substrates in the form of thin films with control of the deposition rate. (AlPcF)<sub>n</sub> thin layers are doped by NO<sub>2</sub> or O<sub>2</sub> diluted at various concentrations in N<sub>2</sub> and their conductivity variations are studied as a function of time, temperature and doping gas concentration. The doping process is reversible, and the experimental results are interpreted in terms of adsorption and diffusion of the gas in the polymer, charge transfer, and transport of the injected carriers in the polymer chain.

These experimental results and previous studies on other polymers and oxidizing gases demonstrate the potentiality of such materials to be used as sensitive part of gas sensors.

**Index terms:** Phthalocyanines, thin films, conductivity variations, gas concentration, doping, adsorption, diffusion, reversibility, charge transfer, gas sensor, air pollution.