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**FABRICATION OF A QUICK RESPONSE, POLYANILINE
BASED HUMIDITY SENSOR**

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ABSTRACT

Conducting polymers such as polyaniline has received attention as active materials for gas sensors due to their versatility easy synthesis and low cost. Application of polyaniline in pressed pellet form for hydrogen and moisture sensing has been reported. The use of pellets in gas sensing creates a slow and tailed response due to the diffusion of gas through the matrix of the polymer. Also they require substantially long times to recover, making the sensor unsuitable for recording rapid changes in moisture levels. In this project attention has been given to construct of a thin film past responding polyaniline moisture sensor. In order to do this glass surfaces were functionalized with polyaniline.

First the glass surface was chlorinated using thionyl chloride. Then a layer of polyaniline was chemically deposited on the surface. Electrical contacts between surface layer and external circuit were made through electrochemically deposited polyaniline on the wrapped platinum wires. In this way a highly conducting polymer – metal junction was obtained. The sensor was used to determine gas sensing properties of polyaniline. Gas sensitivity of polyaniline was studied under N_2 , O_2 , NH_3 , LP gas and moisture and for this purpose conductivity alteration of the film was considered. The sensor was then calibrated for moisture by exposing it to controlled humidity environments and by measuring electrical conductance using a portable conductivity meter.

According to the result obtained, sensor exhibited fast response to humidity changes. The sensor responses almost to the full range of humidity as compared to sensors with limited responding ranges reported in literature. Further, the sensor responded and recovered quickly and its response is reproducible. The sensor did not respond to N_2 , O_2 and LP gas, but responded to NH_3 vapour. In contrast to humidity, the conductance of the thin film of polyaniline decreased when exposed to NH_3 . However, when exposed for a long period of time the conductance increased due to the presence of humidity in the NH_3 vapour.