CHARACTERIZATION OF PLASMA DEPOSITED THIN FILMS USING CONTACT ANGLE MEASUREMENTS

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1. Introduction

Plasma polymerization using low-pressure RF-excited discharges is a currently used technique in materials science and technology. The reason is that within such kind of plasmas electrons are in thermal non-equilibrium with the heavy particles, i.e.; ions and neutrals. Plasma polymerized diglyme thin film is an appropriate material for biomaterials applications. The deposition under customized conditions may be used for improving wettability properties of polymers like for instance PMMA. This paper deals with the plasma polymerization of diglyme over PMMA surfaces at different RF-power coupled the plasma chamber in order to improve the hydrophilic feature of PMMA for biomaterial applications.

2. Experimental

Diglyme thin films were deposited over PMMA substrates at three different RF power values at a fixed pressure of 200 mTorr during 20 minutes within a cylindrical stainless steel parallel plates plasma reactor. The surface wettability was investigated using contact angle measurements with a Ramè-Hart goniometer. The data were collect at five different points of the sample being the results obtained after the average taken over five different measurements for each point.

3. Results and Discussions

Experimental results showed that the contact angle decreased from 82° to 29° for diglyme deposited over PMMA at 5 W. This value changed to 53° when RF power is increased to 20 W. These results suggested that the increase of RF power produces much more fragments of the monomer reducing its functionality. These results are entirely compatible with mass spectrometry collected previously (not shown in this paper).

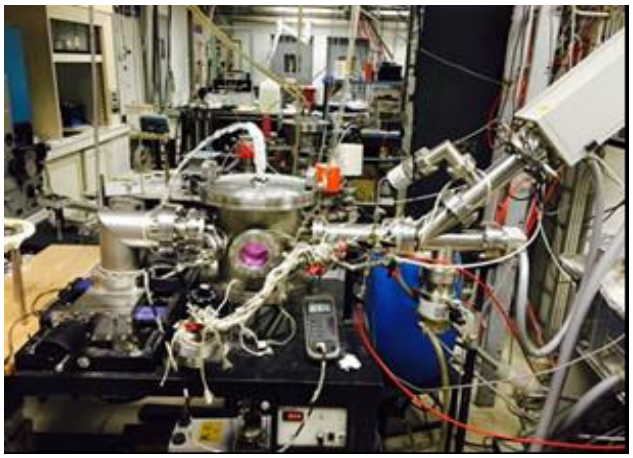

Fig. 1. *Picture of the plasma reactor with the mass spectrometer and the vacuum system*

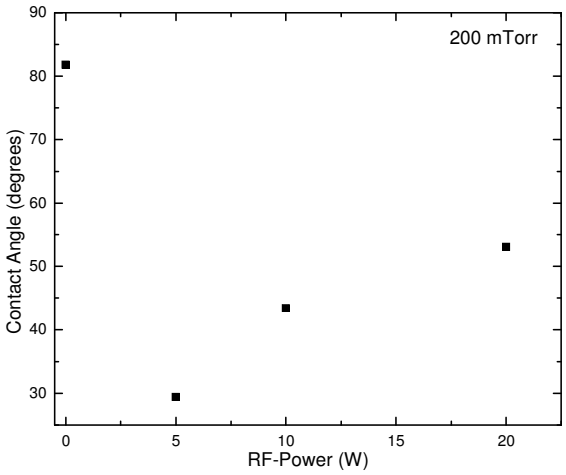

Fig. 2. *Contact angle RF-power dependence of diglyme films deposited at 200 mTorr.*

4. References

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