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Formation of hydrophilic polymer films by DC-plasma of monomer and reactive gases

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In the field of material science, the interests and efforts to modify the surface of materials in agreement with the need of usage have been extensively increasing. The modification to improve the wettability of surface is very important in terms of adhesion, printing, etc. It is very difficult to modify metal surface into hydrophilic one. Therefore, surfactant coating has been generally used in many cases. However, surfactant has disadvantages such as environmental problem, soluble in water. In this study, hydrophilic polymer films as alternative of surfactant were deposited on metal substrate by DC plasma polymerization. Hydrophilic polymer films deposited by DC plasma show many merits such as good wettability, strong adhesion to substrate, high resistance to most chemicals. Monomer gas and reactive gas were used as source of plasma polymerization. Plasma polymerized films were fabricated with process parameters of deposition time, ratio of gas mixture, current, pressure, etc. Effects of these variables on wettability of plasma polymer films will be discussed. With XPS and FT-IR analyses of plasma polymeric films, the relation between wettability and chemical state of polymer films by DC plasma was investigated.