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Surface photografting modification of textile

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It is known that the surface of synthetic fibers is generally inert and absent of polar functional groups, making them almost impossible to chemically bond to other materials. Therefore, surface modification is highly desireable to tailor the chemical and physical structures of the surface layers of textile fibers, and thus improve the properties of fibers in many applications.

In recent decades, we have performed investigations on the surface photografting modification of polymeric films and unwoven cloth. Novel and versatile strategies have been developed based on the UV-induced abstraction of hydrogen which is contained in almost all polymeric materials. It is conceivable that these photografting techniques are feasible in the area of surface modification of textiles.

The considerable efforts we have devoted in surface photografting involve the introduction of reactive functional groups, grafted polymer chains and three dimensional structures onto surfaces of polymeric materials.

A "Confined Photocatalytic Reaction" (CPR) was proposed and by which functional groups such as sulfate anion (Yang *et al*., 2007), hydroxyl (Yang *et al*., 2008), amido (Zhao *et al*., 2007) and dormant semipinacol, which could act as further initiating or conjugation site, were deliberately planted on the surfaces of polymeric materials. Based on a mechanism of "Confined Photocatalytic Oxidation" (CPO), an array of sulfate anion groups were covalently attached on polymeric materials and further hydrophilic/hydrophobic hybrid surface was created. The patterned wettability has been used for fabricating polyaniline (PANI) and titanium dioxide (TiO_2) micropattern. Upon hydrolysis of sulfate anion groups, hydroxyl groups were formed, which could act as initial reagents for subsequent attachment of –osn (Oct) groups and surface-initiated ring-opening polymerization of ε-caprolactone (ε-CL) on PP film, or for a series of alternate reactions to construct a molecular-level multilayer film on polymer surfaces via chemical bonding assembly. Furthermore, in terms of the confined photocatalytic reaction, hydroquinone grafted PP film was produced, which could be used as an effective polymer-

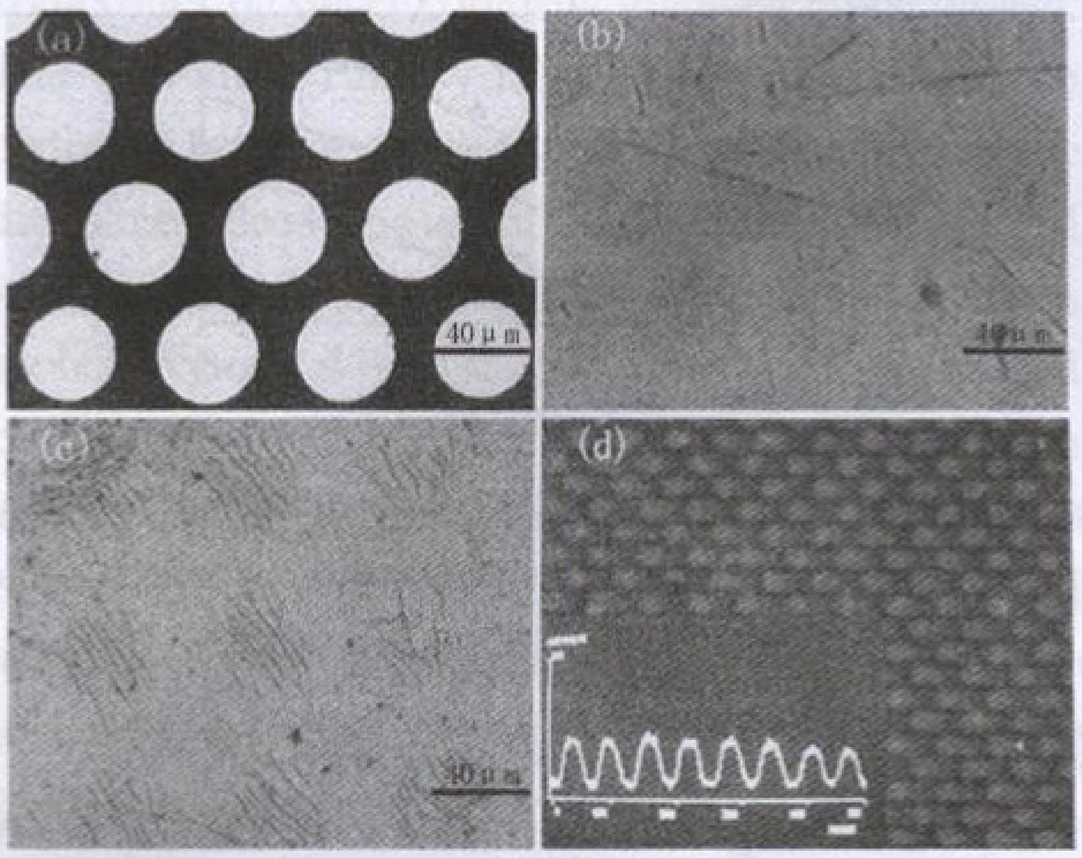

Fig. 1. Photomask (a) aminated film stained by sumikaron red aqueous solution (b) electrostatic self-assembling of HRP (c) and IgG. (d).

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