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ADEKA Corporation

People- and eco-friendly, a water-soluble UV curing material is developed with low VOC content

ADEKA Corporation (President and Chief Executive Officer: Hidetaka Shirozume) has developed a water-soluble UV curing material, a people- and eco-friendly resin material that can be cured by the use of ultraviolet rays (UV) and LED.

The water-soluble UV curing material (hereinafter, “THE MATERIAL”) is a totally new, high-functional material: it excels in water resistance, a common problem in water borne materials, while having a “water-soluble molecular structure” designed with a combination of our organic synthesis technology and UV curing technology.

Emissions of volatile organic compounds (VOCs) from organic solvents contained in materials such as printing ink and coating agents can adversely affect human body and cause air pollution. For this reason, environmental regulations on VOCs have been tightened globally. Development efforts are underway in materials such as water borne UV curable materials, for the purpose of reducing their VOC emissions. Nevertheless, organic solvents system still remain common.

THE MATERIAL involves no use of organic solvents and does not have adverse effects on workers. It minimizes the risk of air pollution, sick building syndrome and other hazards. THE MATERIAL forms a high-density structure after UV curing, which improvements oxygen barrier properties. For example, it can be improved the quality retention performance of c content in plastic container by coating. Moreover, THE MATERIAL is more reactive than conventional water borne UV curing materials and is characterized by high water resistance.

We develop products to satisfy needs in printing, coating, electronic materials, displays and any other applications in an effort to contribute to the reduction of burdens on people and the environment.

◆Information about the water-soluble UV curing material◆

(1) Characteristics and expected effects

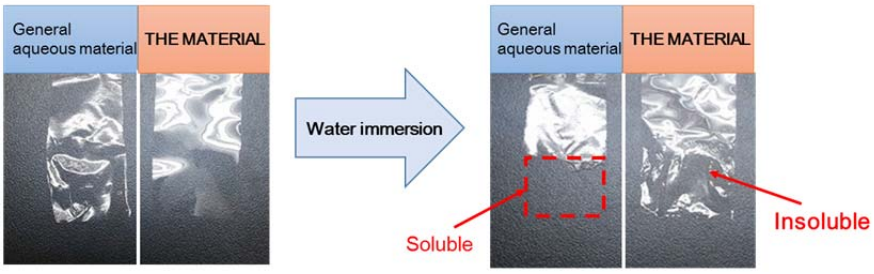
i. No use of organic solvents

Many conventional materials had to be dissolved in an organic solvent or involved dispersion of resin in water. We originally designed a “water-soluble molecular structure” which is characterized by high water solubility and uses no organic solvent. This achieves low VOC content in drying.

	THE MATERIAL	Water borne UV curing material (emulsion type)	Organic solvent-based UV curing material
Ingredients	**Water** + polymer + photoinitiator + monomer	Water + organic solvent + polymer + photoinitiator + monomer	Organic solvent + polymer + photoinitiator + monomer
Solubility	**Entirely water soluble**	Dispersed in water	Soluble in organic solvents
VOC emission	**Low**	Intermediate	High

ii. High resistance to water

Conventional water borne materials tended to entail poor resistance to moisture in the cured film. In contrast, THE MATERIAL is highly resistant to water thanks to the optimized design of its structure and compounding.



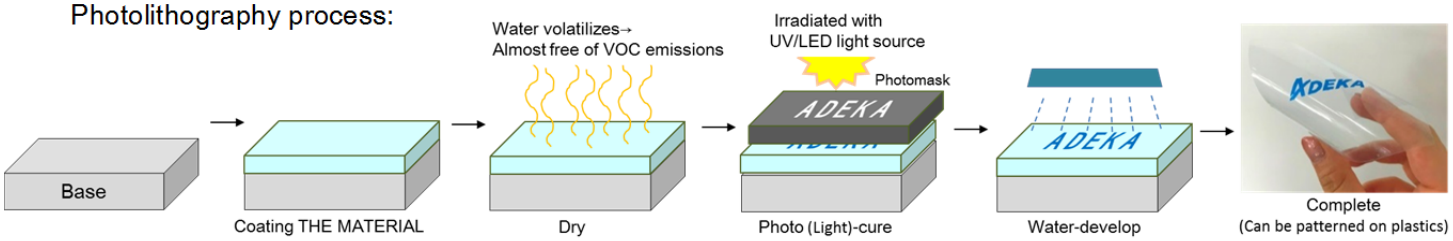
iii. High oxygen barrier properties

Coating THE MATERIAL on polyethylene or other types of plastic film can reduce its oxygen permeability to approximately one tenth and can be expected to prevent its content from oxidizing, enhancing its preservability.

iv. Patterning can be performed with water only

In a photolithography process, patterning can be performed with the use of water only. In photoresist materials, circuit materials and other electronic materials, THE MATERIAL can be expected to be applicable to plastic substrates that have weak resistance to organic solvents.

Photolithography process:



v. Curing can be performed with LED light source

In recent years, the light source for curing is shifting from mercury lamps to LED lamps, driven by consideration about the environmental impact. THE MATERIAL is also applicable to the various wavelength of LEDs (ex. 365, 385, 395 and 405 nm), in addition to the use of a mercury lamp in curing.

(2)External evaluation

THE MATERIAL was announced at the 27th Polymer Materials Forum (held by the Society of Polymer Science, Japan on November 21) and received the Publicity Prize from the Public Relations Committee of the Society of Polymer Science, Japan.

(3)Assumed applications

Printing ink, Coating agents, Photoresist materials, Circuit materials, Paints, Adhesives etc.

■ Contacts

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