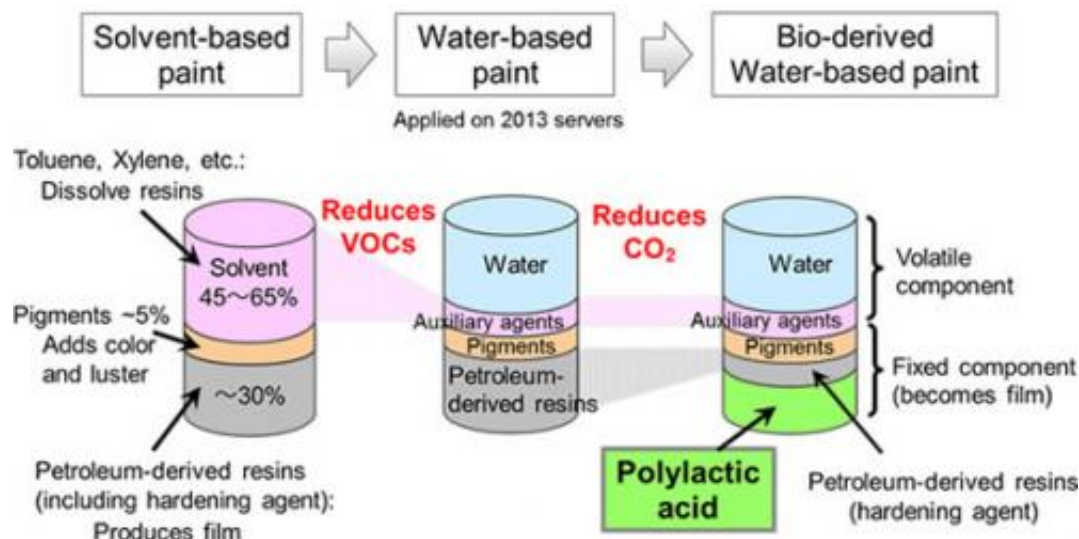


# Fujitsu laboratories develops industry's first bio-derived, water-based paint

December 10 2014



Fujitsu Laboratories, in an industry first, today announced the development of a bio-derived, water-based paint that can be used to paint the plastic chassis of servers, PCs, and other ICT equipment. The newly developed bio-derived, water-based paint uses an emulsion of polylactic acid resin, derived from plants. Using reactive isocyanate promotes hardening, while applying heat promotes bonding among the polylactic acid particles. Both reactions result in good film-forming performance even at low temperature. Compared to conventional solvent-based paint, the newly developed paint reduces CO<sub>2</sub> emissions by 60%

and volatile organic compounds (VOC) by 80%. Fujitsu plans to expand the use of this paint in its own products, such as servers and PCs, in order to conserve resources and reduce environmental burden. This technology will be exhibited at Eco-Products 2014, running December 11-13 at Tokyo Big Sight.

With the acceleration of global warming, reducing CO<sub>2</sub> emissions is an urgent matter. Moreover, reduction of the VOCs that are a source of photochemical smog is also an increasingly serious issue for protecting the environment. VOCs are mostly found in solvent-based paints, printing inks, adhesives, detergents, gasoline, and thinners, and paints account for some 40% of all the VOC emissions. In 2002, Fujitsu started using a polylactic acid plastic derived from corn in the chassis of its laptop PCs. In recent years, bio-based materials have been used for solvent-based paints, in addition to materials for chassis. Solvents in paints are a major source of VOCs, so switching from a solvent-based [paint](#) to a water-based paint is an effective way to reduce VOCs. For that reason, in 2013, Fujitsu Laboratories developed the industry's first water-based paint that could be used for ICT equipment, and applied it to Fujitsu UNIX Server SPARC M10-4 and Fujitsu UNIX Server SPARC M10-4S.

## Technological Issues

Switching from solvent-based paint to water-based paint for ICT equipment such as servers and PCs presents a number of challenges in terms of the required coating performance for ICT equipment chassis, specifically hardness, adhesion, chemical resistance, weather resistance, and appearance.

- Paints using polylactic acid emulsion have poor adhesion to the base material and coated film is very weak.
- Polylactic acid tends to degrade in the presence of water, and

water will cause the film to whiten.

- With water-based paints, the resins are dispersed in the water as microparticles, rather than being dissolved, so promoting contact and fusion of particles requires the water to be evaporated. This has required drying temperatures of 100°C or above, which is more than the plastics used in ICT chassis can tolerate without deformation.

Criterion	Required performance for use with ICT equipment
Coating performance	Must satisfy performance required for chassis coatings: pencil hardness, adhesion, chemical resistance, sweat resistance, weather resistance, etc.
Drying conditions	Equivalent to solvent-based paints (30 min or less at 80°C or less)
Substrate compatibility	Must be compatible with plastic chassis: <ul style="list-style-type: none"> <li>• Drying conditions must not deform plastic</li> <li>• Must be compatible with material (PC-ABS plastic, PC plastic, etc.)</li> </ul>
Process complexity	The painting process must be simple: <ul style="list-style-type: none"> <li>• Same as current processes (one coat)</li> <li>• Low cost</li> </ul>
Appearance and finish	Must offer finish, color range, luster, and brightness equivalent to current materials (allow aluminum or pearlescent pigments)
Cost	<ul style="list-style-type: none"> <li>• Less influence from price of petroleum</li> <li>• Lower storage and transport costs</li> </ul>

## About the Technology

Fujitsu Laboratories has worked with Mikasa Paint Company, Ltd. to develop a water-based paint that uses an [emulsion](#) of polylactic acid, which is derived from biomaterials, and that offers the performance required for ICT equipment. This bio-derived, water-based paint uses the effects of a hardening reaction and fusion to form a coating film with the high performance required for ICT equipment. Features of the

technology are as follows.

1. Hydroxyls that promote the degradation of polylactic acids in water are bonded with isocyanates into urethane, which limits this degradation to produce a tough, water-resistant coating.
2. Minute additions of supplementary solvents (auxiliary agents) adjust the volatility of the water content, promoting the reaction of polylactic acid with isocyanate into urethane. This provides good adhesion and good film-forming performance required of ICT equipment, at a temperature low enough that plastic will not be deformed.

The use of this bio-derived, water-based paint enables a 60% reduction in CO<sub>2</sub> emissions, thereby helping to reduce the burden on the environment. Moreover, compared to conventional solvent-based paint, VOC emissions can also be reduced by 80%.

Fujitsu Laboratories is continuing with R&D work aimed at color tuning and mass production, with the goal of a commercial implementation during fiscal 2016. By applying this technology to Fujitsu's ICT [equipment](#), the company will further its initiatives for resource conservation and reducing the burden on the environment.

Provided by Fujitsu

Citation: Fujitsu laboratories develops industry's first bio-derived, water-based paint (2014, December 10) retrieved 9 April 2024 from <https://phys.org/news/2014-12-fujitsu-laboratories-industry-bio-derived-water-based.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--