Engineers develop process to recycle unused paint by blending it into common plastics

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Engineers at Rutgers, The State University of New Jersey, have developed a process to recycle waste latex paint – the largest component of household hazardous waste – by blending it with common plastics. In laboratory samples, these paint-blended plastics were as good as, and in some cases, superior to the same plastics made without paint.

To advance this promising technology toward commercialization, Rutgers signed a special licensing agreement with Re-Manufacturing Technologies, Inc., a new spinoff of the National Council on Paint Disposition, Inc. That group was formed by a long-time paint dealer and businessman in 2002 to develop a viable approach for reducing the disposal costs and environmental impact of waste paint products.

“Many municipalities forbid discarding paint in the trash because it’s an environmental nuisance – it spills from cans that garbage trucks crush, defacing streets and contaminating refuse-handling equipment,” said Tom Nosker, professor of Materials Science and Engineering at Rutgers and principal investigator at a university center for advanced polymer materials. “They’ve responded by accepting unwanted paint during household hazardous waste recycling days, but then they’re left holding the bag, having to contract for proper waste management at almost $9 per gallon. An effective recycling solution could cut that cost, and possibly even become a money maker.”

Nosker noted that unwanted paint has become the largest component of household hazardous waste – some 68 million gallons annually. And this

doesn't even account for large quantities of paint that commercial painters and retailers dispose because of incorrect tints and inventory miscalculations.

As part of the Rutgers center's ongoing work in plastic recycling, Nosker and postdoctoral research fellow Jennifer Lynch tested the feasibility of blending latex paint solids with two inexpensive and widely available plastics. One is high-density polyethylene (HDPE), commonly used to make milk and laundry detergent bottles; the other is polymethyl methacrylate (PMMA), used in Plexiglas and similar acrylics to make plastic windows and lenses. The paint solids, which remain after the paint's water-based solvent evaporates, are essentially acrylic polymers and colorants.

The engineers found that paint blended with polyethylene exhibited similar characteristics and performance as pure polyethylene, with the advantage of consuming unwanted paint and reducing the amount of HDPE feedstock. The paint and polymethyl methacrylate blends sacrificed transparency, but made the otherwise-brittle plastic more flexible and tough while maintaining stiffness and strength. As a result, paint-blended PMMA might be able to compete with more expensive plastics that combine strength and flexibility, such as for laptop computer housings that need to withstand bumps and falls.

Nosker also noted that plastics made with recycled paints could be used to make paint containers, eliminating metal cans and essentially bringing the paint product's life cycle full-circle. It's also possible that unused paint and the plastic paint container that holds it could be recycled together.

The engineers plan to explore recycling oil-based paints, used far less today than latex paint but representing a greater environmental threat, and look into other petroleum-based materials that unwanted paints

could effectively extend.

Source: Rutgers, the State University of New Jersey