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National Aeronautics and Space Administration

John F. Kennedy Space Center's Activated Metal Treatment System (AMTS) for Paints







The National Aeronautics and Space Administration (NASA) seeks partners interested in the commercial application of the Activated Metal Treatment System (AMTS) for treating polychlorinated biphenyls (PCBs) in paints. NASA's Kennedy Space Center is offering companies licensing or partnering opportunities in the development of this innovative remediation technology.

Current physical removal methods are able to strip off PCB-containing paint from surfaces (e.g., media blasting); however, these methods typically create a new waste stream that must be treated according to Toxic Substances Control Act (TSCA) regulation. In contrast, AMTS extracts PCBs and breaks them down into benign by-products while on the structure. Therefore,

BENEFITS

- No impact to structure—does not affect the material beneath the paint and allows for the surface to be repainted/reused following application.
- In situ—treats PCBs in place, versus traditional abatement methods that generate a secondary Toxic Substances Control Act (TSCA) waste stream.
- Cost-competitive—requires none of the costs associated with placing a building under vacuum or transporting, treating, and/or disposing of a secondary waste stream. Preliminary estimates indicate that AMTS could cost less than $15 per square foot for materials (not including labor). In addition, total costs (materials plus labor) are anticipated to be less than comparable costs for media-blasting.
- Effective—has been shown in lab-scale and field-scale tests to remove approximately 80% of PCBs from paint (three layers in thickness with initial PCB concentration as high as 700 parts per million [ppm]) within 4 hours, and approximately 100% of PCBs within 48 hours.
- Safe—produces benign by-products.
- Versatile—can be used as a "paint-on/wipe-off" method for in-situ applications or as an immersion method (e.g., for dismantled parts awaiting disposal).

technology ■ opportunity

APPLICATIONS

- Painted structures such as buildings and ships
- Concrete surfaces contaminated by PCB-laden transformer oil
- Caulks and other adhesives
- Electrical equipment
- Soils (ex situ)
- Other PCB-contaminated debris

TECHNOLOGY STATUS

- ☑ Patent pending
- ☑ U.S. patent No. U.S. patent 7,271,199
- ☐ Copyrighted
- ☑ Available to license
- ☐ Available for no-cost transfer
- ☐ Seeking industry partner for further codevelopment

no additional treatment for PCBs is required. Also, because the treated surface can be reused following application, AMTS has advantages over other methods and often opens up recycling opportunities that would not have been possible prior to AMTS' application.

Technology Details

PCBs have been shown to cause cancer in animals and to have other adverse effects on immune, reproductive, nervous, and endocrine systems. Although the production of PCBs in the United States has been banned since the late 1970s, many surfaces are still coated with PCB-laden paints. The presence of PCBs in paints adds complexity and expense for disposal. Some treatment methods (e.g., use of solvents, physical removal via scraping) are capable of removing PCBs from surfaces, but these technologies create a new waste stream that must be treated. Other methods, like incineration, can destroy the PCBs but destroy the painted structure as well, preventing reuse.

To address limitations with traditional abatement methods for PCBs in paints, researchers at NASA's Kennedy Space Center (KSC) and the University of Central Florida have developed the Activated Metal Treatment System (AMTS) for Paints. This innovative technology consists of a solvent solution (e.g., ethanol, d-limonene) that contains an activated zero-valent metal.

AMTS is first applied to the painted surface either using spray-on techniques or wipe-on techniques. The solution then extracts the PCBs from the paint. The extracted PCBs react with the microscale activated metal and are degraded into benign by-products. This technology can be applied without removing the paint or dismantling the painted structure. In addition, the surface can be reused following treatment.

Partnership Opportunities

All NASA licenses are individually negotiated with the prospective licensee, and each license contains terms concerning commercialization (practical application), license duration, royalties, and periodic reporting. NASA patent licenses may be exclusive, partially exclusive, or nonexclusive. If your company is interested in the new Activated Metal Treatment System for Paints technology, or if you desire additional information, please reference Case Number KSC-12878 and contact:

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14. ABSTRACT
This new technology report will describe the laboratory development of a new and innovative solution for the removal and destruction of PCBs found in painted structures or within the binding or caulking material on structures. The technology incorporates a Bimetallic Treatment System (BTS) that extracts and degrades only the PCBs found on the facilities, leaving in most cases the structure virtually unaltered.

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