

Abstract Submitted
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Air Purification Pavement Surface Coating by Atmospheric Pressure Cold Plasma JOE WESTERGREEN, PATRICK PEDROW, SHIHUI SHEN, BERTRAM JOBSON, Washington State University — This study develops an atmospheric pressure cold plasma (APCP) reactor to produce activated radicals from precursor molecules, and to immobilize nano titanium dioxide (TiO_2) powder to substrate pavement materials. TiO_2 has photocatalytic properties and under UV light can be used to oxidize and remove volatile organic compounds (VOCs) and nitrogen oxides (NO_x) from the atmosphere. Although TiO_2 treated paving materials have great potential to improve air quality, current techniques to adhere TiO_2 to substrate materials are either not durable or reduce direct contact of TiO_2 with UV light, reducing the photocatalytic effect. To solve this technical difficulty, this study introduces APCP techniques to transportation engineering to coat TiO_2 to pavement. Preliminary results are promising and show that TiO_2 can be incorporated successfully into an APCP environment and can be immobilized at the surface of the asphalt substrate. The TiO_2 coated material with APCP shows the ability to reduce nitrogen oxides when exposed to UV light in an environmental chamber. The plasma reactor utilizes high voltage streamers as the plasma source.

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