

PI NAME	Marc A. Anderson
PI INSTITUTION	University of Wisconsin-Madison, WI
TITLE	Photocatalytic Oxidation of Gas-Phase Constituents Comprising Environmental Tobacco Smoke
KEYWORDS	Photocatalytic Oxidation (PCO), Remediation, ETS
SUMMARY (optional)	<ul style="list-style-type: none"> • Tests the hypothesis "that exposure to gas-phase constituents of ETS and other indoor air pollutants can be significantly reduced by employing a photocatalytic reactor that oxidizes these gas-phase pollutants." "Oxidation" can mean both degradation (transformation into another compound) and mineralization (conversion into CO₂, H₂O, HX). • Seeks to determine the efficacy of UW-Madison's bench-scale photocatalytic reactor to "mineralize" a number of selected compounds.
NOTES (optional)	<ul style="list-style-type: none"> • Currently employed technologies for gas-phase removal of indoor air contaminants are based on adsorption materials, such as activated carbon and zeolites. PCO is an emerging technology. PCO based air cleaners are commercially available. • UW-Madison intends to use sol-gel processing techniques to prepare titania-based photocatalysts as porous thin film coatings ("additives" e.g., Pt, can be included). • The Proposal touches on the "mechanism" of PCO, but leaves unclear how heterogeneous catalysis in this application would work. • Mineralization is monitored by feed stream/product stream differential, and by CO₂ production (stoichiometry). The latter is difficult to perform. • Byproduct analysis is conducted, however, it remains unclear what is meant by "undesired byproducts" (only phosgene is mentioned once). The "mineralization equation" is incomplete (what happens to nitrogen- and sulfur-containing compounds?) • Possible "fouling" of the catalyst is monitored by conducting long-term experiments
RECOMMENDATION	PI conducts "applied" research, where the basics may not be fully understood. However, since PCO-based air cleaning is already being commercially used, results form "applied" research is useful information. The study would help to understand the strength and weaknesses of PCO. Funding should be considered.
SCORE (10=high, 1=low)	8
ETS RELEVANCE	High
DURATION (years)	2 years
BUDGET (1st year)	\$ 211.300
REVIEWER	M. Schorp