Experimental research on photocatalytic oxidation air purification technology applied to aircraft cabins - DTU Orbit (18/01/2019)

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The experiment presented in this report was performed in a simulated aircraft cabin to evaluate the air cleaning effects of two air purification devices that used photocatalytic oxidation (PCO) technology. Objective physical, chemical and physiological measurements and subjective human assessments were used for the evaluation. Comparisons were made between conditions with and without the PCO units installed in the re-circulated air system. Four groups of 17 subjects were exposed for 7 h to each test condition. Chemical analysis indicates that ethanol, isoprene and toluene were decomposed by oxidation in the PCO units tested. However, some intermediate products, such as formaldehyde and acetaldehyde, were detected. Physiological measurements did not show any significant effects of the two PCO units except that skin dryness was reduced by operating PCO unit 2. Both positive and negative effects of using PCO units on subjective assessments were observed after the first 3 1/4 hours of exposure. After 6 h of exposure, a positive effect of using either PCO unit on symptoms of dizziness and claustrophobia was observed.

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Contributors: Sun, Y., Fang, L., Wyon, D. P., Wisthaler, A., Lagercrantz, L. P., Strøm-Tejsen, P.
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