



Glenn Research Center

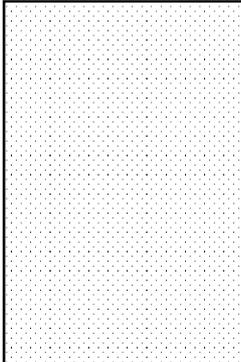


# Smoldering Combustion in Microgravity

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- ◆ Smoldering combustion is a non-flaming surface reaction that spreads through the interior of porous materials.
- ◆ It is commonly encountered in tobacco smoking and in accidental fires (e.g., within furniture cushioning).
- ◆ Smoldering fires can progress undetected for long periods, producing toxic gases (e.g., carbon monoxide), and then suddenly change to flaming.
- ◆ Preliminary results from a shuttle-based experiment indicate that toxic gas production in microgravity smoldering may be much greater than in smoldering on Earth.
- ◆ A peer-approved Space Shuttle experiment is already in preparation, based on the results of this effort. The objective of the follow-on study is to better understand the smoldering processes in order to improve techniques for the prevention and detection of smoldering conditions on spacecraft, and ultimately on Earth.

Principal Gaseous Products (mean ppm)

Species	1g	0g	Ratio 0g:1g
CO <sub>2</sub>	3100 	7000 	2:1
CH <sub>4</sub>	<5 	220 	44:1
CO	~4 	1200 	300:1