

Periodic Graphics

A collaboration between C&EN and Andy Brunning, author of the popular graphics blog *Compound Interest*

More online

To see more of Brunning's work, go to compoundchem.com. To see all of C&EN's Periodic Graphics, visit cenm.ag/periodicgraphics.

The chemistry of airplane air



About to board a flight? This graphic looks at the chemistry that cleans the air you breathe on a plane, as well as the reactions that produce oxygen in an emergency.



Air on an airplane

Airliners pressurize their onboard air to make flights more comfortable.



Cruising altitude (~11,000 m)

Air pressure: 22.8 kPa



Cabin altitude (~2,438 m)

Air pressure: 75.1 kPa



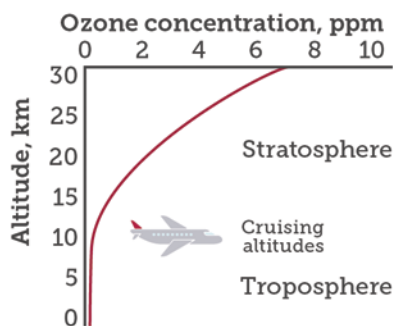
Sea level (0 m)

Air pressure: 101 kPa

Cabin air is a mix of fresh air from outside and filtered inside air and is renewed up to 30 times an hour. High-efficiency particulate air filters remove bacteria, fungi, and viruses.

Breaking down ozone

Airplanes cruise in the lower stratosphere, where the ozone concentration is slightly higher than at ground level. This can lead to increased ozone levels in the aircraft's cabin, which can cause headaches and breathing problems. Ozone can also react with compounds in skin oils to form irritant aldehydes.

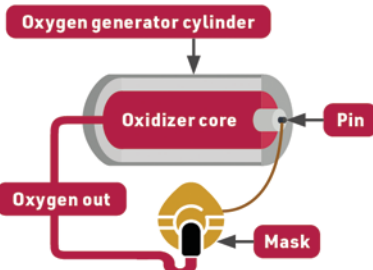


Many planes use devices to convert ozone in air into oxygen before it enters the cabin. They also reduce cabin odors.



Emergency oxygen

A chemical system produces the oxygen provided by masks that drop from an airplane's ceiling during an emergency. Pulling the mask down releases a firing pin from the oxygen generator.



This release ignites a mixture of an oxidizer (commonly sodium chlorate) and iron powder. The heat from burning iron decomposes the oxidizer, a process that produces oxygen. The generator produces oxygen for 15–20 min, long enough for the plane to descend to an altitude at which ambient air is breathable.

