

## Should Santa wear a flame-retardant suit?

### What are flame retardants?

Flame retardants are compounds added to household items, electronics, and more to slow down the start and growth of fires. They are usually organohalogens: carbon-based molecules manufactured to have at least one type of halogen element, like chlorine or bromine.

For an atom to be good for determining the Earth's age, both the parent and daughter atoms must be stable enough to persist for billions of years, and must be present in the material you are dating (like ancient rocks, for example). Uranium, which decays through a series of radioactive elements into lead (Pb), is a common choice.

### How do they slow fire?

If Santa hopped down a chimney onto a still-burning fire and set his trousers ablaze, the combustion reaction would look something like this:

Atmospheric oxygen reacts with the flames to form hydroxyl radicals. Hydroxyl radicals have an unpaired electron in need of a bond, so they snap up hydrogen atoms from the fuel source (Santa's pants), feeding the fire.

To slow a fire down, a flame retardant like TDCPP gives off hydrogen chloride (HCl) when heated. Instead of snapping up hydrogen from the fuel source, the fire gets hydrogen from the HCl, leaving behind a chlorine radical. Because chlorine radicals are more stable than oxygen radicals, they don't react as easily, and slow down the whole combustion reaction.

### Toxicity

Most flame retardants are coated onto products instead of being chemically bound to them, so the molecules can leach into foods and onto household surfaces, and build up in our bodies over the years. Mounting evidence suggests that some flame retardants are hazardous to our health and to the environment. They have been linked to:

- Endocrine disruption
- Developmental & reproductive problems
- Some types of cancers

\* Learn more about flame retardants and their potential effects on Santa here

### Sources:

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