Since oxygen fuels fire, why don’t humans spontaneously combust?

Dioxygen (O_2) molecules are diradicals, with two unpaired electrons, which can be depicted as one unpaired electron around each of two oxygen nuclei. Dioxygen is involved in many chain reactions of organic matter, the best known of which is fire.

‘Oxygen is energy-rich and not for nothing is it a choice liquid propellant for rockets,’ chemists in the US and Belgium write in their new paper. They also note that almost every compound in the human body ‘is subject to combustion with oxygen’. ‘We can burn, and not just with passion.’ So why don’t we regularly spontaneously combust?

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The simple answer is that dioxygen is much less reactive than we might expect a diradical to be.

Bonding is relevant thanks to the fundamental physical quest in which molecules find the most stable, lowest energy state possible. For many radicals, stealing a hydrogen atom from another molecule is a simple step to a lower energy state.

But that’s not true for the dioxygen diradical – we’re able to breathe it safely, because it usually leaves the hydrogen atoms in our tissues, and everywhere else, alone.

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Could these results finally dispel the myth of spontaneous human combustion? Hoffmann highlights that chemists have tried to do this for over 160 years.

The GLP aggregated and excerpted this blog/article to reflect the diversity of news, opinion, and analysis. Read full, original post: Chemists unravel why humans aren’t constantly bursting into flames