BUSINESS, GEAR, PLANET, POLLUTION

TOXIC TRACTION:
POLLUTION RISKS IN INDOOR CLIMBING GYMS

By Tim Marklowski

The rubber soles of climbing shoes leave more than just black marks on bouldering gym holds. New research reveals they're also polluting the air inside the gyms – with potentially harmful consequences. The industry is now under pressure to respond.

The environmental scientist Dr. Anya Sherman enjoys climbing – it's a balance to her work in the lab and office at the University of Vienna. At a conference in 2024, she met Thibault Masset from Federal Polytechnic School of Lausanne (EPFL), who researches similar topics and is also a passionate climber.

"We were both familiar with the black residues on the holds in climbing gyms, the abrasion from shoe soles," says Dr. Anya Sherman.

The discussion led to an investigation. Using a device that simulates the uptake of particles through human respiration, Sherman collected air samples in five bouldering gyms in Vienna. Additional dust samples came from gyms in France, Spain, and Switzerland.

Preliminary result in summer 2024: high concentrations of chemicals were measured in the air of climbing and bouldering facilities—substances otherwise known from tire abrasion.

Air quality like in megacities

At the end of April 2025, **the results were officially published** – and they were sobering:

"The values are among the highest ever documented worldwide, comparable to multi-lane roads in megacities," says lead researcher Professor Thilo Hofmann at the University of Vienna.

To identify the source of the air pollution, climbing shoes were examined. In the 30 pairs studied, concerning chemicals were found, including 6PPD: a rubber stabilizer linked to

studied, concerning chemicals were found, including of PD, a rubber stabilizer linked to salmon die-offs in waterways. What this means for human health is still unclear. Nevertheless, Hofmann emphasizes:

"These substances do not belong in the air we breathe. It makes sense to take action before we fully understand all the risks, especially considering sensitive groups like children."

For the researchers, it's also clear who must take action: climbing gyms and shoe manufacturers. On the one hand, professional ventilation systems and regular cleaning are needed. On the other hand, shoe manufacturers bear primary responsibility.

Anya Sherman uses an impinger (particle measuring device) to collect particulate matter from the air in bouldering gyms in Vienna. (Photo: Aaron Kintzi/CeMESS)

Responsibility shared between gyms and brands

Benjamin Jordi, Managing Director of the Association of Swiss Bouldering and Climbing Facilities (VSBK), agrees.

"We immediately informed our members about the study results and emphasized the importance of ventilation and cleaning."

Employee protection, especially in route setting, must also be ensured – for example, through protective masks.

"We will soon develop a position paper that will also include demands directed at shoe manufacturers," says Benjamin Jordi.

Patrick Hilber, CEO and owner of the Kletterzentrum Gaswerk AG with three gyms in Switzerland, takes it calmly.

"This discussion confirms our approach," he says.

Even before, due to magnesium dust and "sports odors," they had relied on high-tech ventilation systems.

"In our bouldering rooms, the air can be completely exchanged within four minutes."

Thomas Schmid, President of the Vidmar Boulder Association and former member of the Swiss national climbing team, believes healthy bouldering must also be possible outside of expensive high-tech facilities.

"For smaller, non-commercial bouldering spaces like ours, installing industrial ventilation is not a viable solution. What we need are safe climbing shoes, so that affordable training spaces can continue to exist."

Shoe brands show little transparency

And what do the shoe manufacturers say?

Scarpa declined to comment. La Sportiva at least announced a statement soon. The company

also stated that about 90% of the rubber soles used in their climbing shoes come from Vibram.

According to Vibram, none of the substances identified in the study are added to their soles. However, it is possible that the substances come from the shoe edges, which the company does not produce. The soles were tested in an external lab, and the harmful chemicals found in the gyms were not detected.

That the external lab couldn't detect the substances does not surprise Professor Hofmann:

"Not every lab has sufficient technical capabilities for this, and it also depends on the concentration at which a substance is considered detected."

There are no official limit values. That Vibram itself does not add the substances, Hofmann finds credible:

"The question is where the rubber compounds originate and what they already contain."

Many climbing gyms already use high-tech ventilation systems – also due to magnesium dust and the smell of sweat. (Photo: Nathan Cima / Unsplash)

Researchers push for collaboration

The authors of the study consider collaboration between research and industry to be important. Several proposals for joint research projects were made to Vibram, but so far, none have been accepted.

The researchers remain in dialogue with Vibram and are generally optimistic. Overall, the climbing industry has shown a solution-oriented approach. But potential collaborations come with a disclaimer.

"As a university, we do not conduct contract research with confidentiality clauses, only research collaborations whose results can be published," says Hofmann.

Fact Box

Does this mean no more going to the climbing gym? Of course not! But to make it safer you can:

- Avoid rush hours.
- Use halls with good ventilation.
- Remind operators to ventilate.
- Do not take small children into bouldering halls.
- Vulnerable people can wear masks until more is known about the problem.
- Use liquid chalk, magnesia dust also influences the air quality.
- Use outdoor gyms.

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Lead Photo: Aaron Kintzi/CeMESS

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