

New Research says One Scratch in a Nonstick Pan Can Shed 9,100 Plastic Particles and a Broken Coating Up to 2.3 Million

Researchers found in a 2022 study in Science of the Total Environment that a single crack in a nonstick coating can release about 9,100 plastic particles

POMONA, CA, UNITED STATES, August 18, 2026 /EINPresswire.com/ -- A single scratch in a nonstick pan can release about 9,100 plastic particles, and a coating that has broken down can shed up to 2.3 million microplastic and nanoplastic particles, according to a [2022 study published in Science of the Total Environment](#). Researchers at Flinders University and the University of Newcastle measured the release using Raman imaging, a technique sensitive enough to count individual particles.

The team examined Teflon-coated cookware and found that once the surface is damaged, the coating flakes directly into food. The imaging allowed the researchers to quantify how much was released, from a single hairline crack to a coating that had visibly broken down. One crack released thousands, while a broken-down coating released millions.

The numbers behind the study

About 9,100 plastic particles released from a single surface crack (Science of the Total Environment, 2022)

Up to 2.3 million microplastic and nanoplastic particles shed from a broken coating (Science of the Total Environment, 2022)

Method: Raman imaging of Teflon-coated cookware (Science of the Total Environment, 2022)

The authors' takeaway: damaged nonstick coatings are a direct source of microplastics (Flinders



Taima Titanium cookware review

University, 2022)

What a damaged coating means
Visible scratches, chips, or flaking on a coated pan indicate a surface that is already releasing particles, not one that merely looks worn. In the study, the coating, rather than the act of cooking, determined whether particles ended up in food. Removing a damaged coated pan from use, or cooking on an uncoated solid-metal surface, removes that particular source. The finding adds to a broader body of research on microplastics in the food supply, with cookware among many everyday sources.

"Nearly every kitchen in the country has a nonstick pan with a few scratches in it, and this research finally puts a number on what each of those scratches means," said a spokesperson for Taima Titanium, a direct-to-consumer titanium cookware brand. "A coating cannot flake into food if there is no coating. That is the design logic of cooking on bare metal."

New Study Shows a Single Scratch On a Non-Stick Coated Pan Releases 9000 Toxic Micro-Plastic Particles, While a Broken Coating Releases 2 Million

0 Coatings. 0 Toxins
0 Worries

Unlike any other coated pan...

It Protects
Your Health From...

- ✗ Gut Issues
- ✗ Cancerogens
- ✗ Toxin-Poisoning
- ✗ Hormone Disruption
- ✗ Chronic Inflammation
- ✗ Weakened Immune System

Taima Titanium Reviews

About Taima Titanium

Taima Titanium is a direct-to-consumer cookware brand built on a bare Grade 1 titanium cooking surface, with no PFAS, no PTFE, and no chemical nonstick coating that can scratch, chip, or shed. The company is based in Pomona, California. More information is available at taimatitanium.com.

Taima Titanium Team

Taima Titanium
+1 831-480-0618
hello@taimatitanium.com

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