

Before the Senate Environment and Public Works
Sub-Committee on Chemical Safety, Waste Management, Environmental Justice, and
Regulatory Oversight

Testimony of Humberto Kravetz
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October 26, 2023

Good morning, Chairman Merkley, Ranking Member Mullen, and Members of the Subcommittee. My name is Humberto Kravetz, founder and CEO of GSF Upcycling. I appreciate the opportunity to appear before the Subcommittee.

Today I will discuss three aspects of my company's innovations that enable true circularity in plastics. First, we can upcycle all types of used plastics back into feedstock. Second, we deliver substantial improvements in the energy and environmental performance of the plastic recycling process. Third, we create a strong economic incentive for communities to keep used plastic out of the waste stream and environment.

Our first breakthrough takes advantage of our proprietary graphene-based nanomaterials—commonly known as carbon-nanotubes. By adding our nanomaterial to tons of used plastics - in a pyrolysis process, any municipal or industrial entity will now be able upcycle the +80% of used plastics, including mixed, dirty and contaminated plastics that are currently too hard to recycle and otherwise end up in landfills, incinerators, or lost to the environment. Examples include packaging materials—about 45% of the global problem—as well as medical devices, automobile parts, circuits boards, and even degraded plastics such as marine debris. We recently validated this in our demonstration plant, using fishing nets collected from local fishermen.

Our nanomaterials enable the process to occur at roughly half the temperature—450°F instead of 800°F—and with a 30-60% improvement in plant performance, thus significantly reducing energy costs and associated greenhouse gases per unit of output.

Just as consequential, our process also captures 60 to 99% of halogens, such as bromine, fluorine, and chlorine, as well as other contaminants of major health and environmental concern. These contaminants can then be segregated for responsible disposition.

Our second breakthrough takes advantage of our proprietary mix of biological enzymes. By placing these enzymes in direct contact with used plastics, we can depolymerize the plastic back to its original building blocks. And unlike other enzymatic methods, our process takes place at room temperature, without the added heat and energy consumption, and without chemical-based solvent pre-treatment that other enzymatic processes require.

We have proven that our enzymatic process can not only handle plastics such as soda bottles (PET), but also plastics that are otherwise expensively and/or incompletely mechanically recycled—for example, Styrofoam packing materials or electronic plastic waste. We are currently developing similar enzymatic treatments for polypropylene and polyethylene packaging materials.

The output of both of our innovations is a high-quality feedstock that can economically compete with new feedstock from fossil fuels. In other words—plastic back into plastic. Our mid-term objective is to decouple plastic production from fossil-based sources. Just as important, it means that upcycling of used plastic can occur at a profit, creating an economic incentive for local communities to construct affordable

upcycling facilities to collect and convert all of their plastics into valuable feedstock at a net savings to their budgets, rather than at a cost.

In summary, our upcycling technology innovations are able to process all types of used plastics—including degraded plastics like marine debris—and produce a high-quality feedstock that can readily be converted back into new plastic. We can perform bio-enzymatic upcycling at room temperature and can significantly reduce the heat needed for pyrolysis, driving substantial reductions in energy consumption, and associated air pollution and greenhouse gases. And we can capture and segregate chemical contaminants in used plastic. By making used plastic too valuable to burn or throw away, we can help make plastic circularity a global reality.

I want to thank you for your time and consideration of this testimony, and I look forward to your questions and comments.