

Perpetuus Announces Breakthrough Replacement for 6PPD in Tires and Elastomers, Solving the 6PPD-Q Crisis

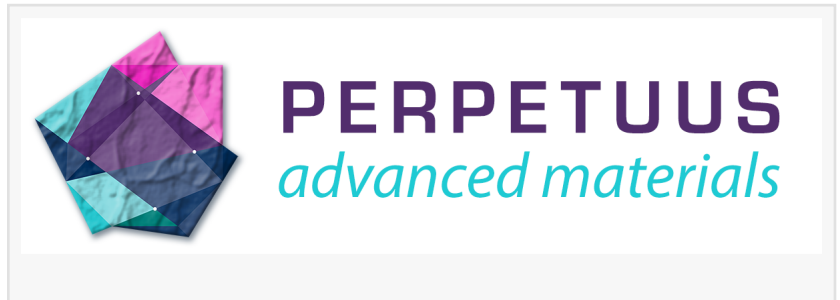
6PPD-free, drop-in graphene masterbatches available in industrial quantities for immediate OEM adoption

SOUTH WALES, UNITED KINGDOM,
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EINPresswire.com/ -- Perpetuus

Advanced Materials, a global leader in

surface engineered graphene technologies, today announced a breakthrough in the global effort to eliminate 6PPD-quinone (6PPD-Q), the highly toxic by-product of 6PPD, a chemical widely used in tires and synthetic rubbers.



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*John Buckland, CEO of
Perpetuus Advanced Materials*

Leveraging its proprietary plasma functionalised graphene nanoplatelets (GNPs), Perpetuus has developed an amine functionalised graphene masterbatch that not only prevents the formation of 6PPD-Q, it replaces 6PPD entirely in rubber formulations.

“This is no longer about mitigation. We’ve replaced 6PPD,” said John Buckland, CEO of Perpetuus. “Our amine

functionalised GNPs deliver the same anti-degradant function as 6PPD, but with zero toxic quinone by-products. This isn’t theory. It works in formulation and scales now.”

Perpetuus’ graphene enhanced elastomer masterbatches ship in industrial quantities, supplied in pre-mixed sheets or blocks for direct integration, removing the need for process change and graphene handling.

In 2020, scientists identified 6PPD-Q as a leading cause of salmon mortality in the Pacific Northwest. Even at trace levels, it causes pre-spawn death in coho salmon within hours of exposure. Regulatory urgency has grown worldwide, yet the industry has lacked a viable, drop-in replacement.

The solution aligns with Washington State's 6PPD Action Plan, providing both a manufacturing fix and a stormwater remediation pathway.

Perpetuus' GNP based solution achieves rubber protection via a different mechanism: the amine groups on the GNPs act as radical scavengers, stabilising the elastomer and eliminating the need for 6PPD altogether.

"This isn't a patch, it's a permanent replacement," Buckland added. "By removing 6PPD at the source, we remove the risk of 6PPD-Q entirely."

While 6PPD is most associated with tires, it is also found in a wide range of synthetic rubber products, including hoses, belts, seals, and anti-vibration mounts. These are used extensively in the automotive, construction, and industrial sectors. Perpetuus' masterbatches are designed to work across all these systems, offering a global path to 6PPD elimination without compromising performance or durability, with price points that enable seamless adoption in commercial supply chains.

To support immediate environmental protection, Perpetuus has also designed a range of GNP based modular filtration systems for stormwater applications, including drop-in drain cartridges, GNP loaded bioreactor modules, and smart filters integrated with PAM AI, Perpetuus' proprietary AI platform that delivers real-time environmental alerts, saturation tracking, and pollutant load reporting.

These filtration units provide rapid deployment options for salmon bearing streams, and urban runoff zones, complementing long-term tire reform adoption.

Production runs on Perpetuus' continuous plasma platform to deliver repeatable surface chemistry and lot-to-lot consistency. The masterbatch covers over 90% of the dry mix ingredients used in tire production and replaces several process oils and additives, improving workplace air quality while keeping mixing simple.

With over a decade of experience in graphene enhanced elastomers, Perpetuus is now seeking regulatory alignment, pilot deployment sites, and OEM collaborations to accelerate industry wide adoption of this breakthrough.

"The science is proven. The solution is scalable. The environmental need is urgent." said Buckland. "The only question left is whether regulators and manufacturers are ready to act. This is the moment to eliminate 6PPD for good and replace it with something better."

ABOUT PERPETUUS ADVANCED MATERIALS

Perpetuus Advanced Materials is a UK-based leader in plasma nano-engineering. Its patented DBD technology produces surface functionalised graphene nanoplatelets and other 2D materials

at industrial scale, supplied as masterbatches and pre-mixed formats for elastomers, polymers, metals, composites, coatings, energy systems, and advanced cooling applications.

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