

Pulpdent awarded two patents for stabilized calcium phosphate molecule with breakthrough hydroxyapatite-stimulating properties

The patented molecule, a methacrylate-functionalized calcium phosphate, shatters the ceiling for bio-interactive materials in dentistry and ushers in new generation of highly esthetic bioactive materials

WATERTOWN, Mass. – January 10, 2022 –Pulpdent, a leading dental researcher and manufacturer, has been awarded two patents by the United States Patent and Trademark Office for a stabilized calcium phosphate molecule. When placed in a dental composite, the bioactive molecule facilitates tooth remineralization, promotes hydroxyapatite formation, and performs at the highest levels of esthetic dentistry. The discovery has the potential to impact millions of patients worldwide by significantly improving the outcomes of dental restorative procedures.

The patented molecule, a methacrylate-functionalized calcium phosphate (MCP), exists in a highly-active, transitional state at the molecular level. When placed in a dental restorative material in the oral environment, MCP is capable of transferring calcium, phosphate, and fluoride from saliva to tooth structure, and creating a scaffold for mineral precipitation, apatite formation, and biomineralization. Unlike any bioactive material introduced to date, it also allows for uncompromised, esthetic anterior restorations.

“The advent of Pulpdent’s two MCP patents represents the culmination of decades of research by our science team,” says Pulpdent Vice President Don Berk. “The behavior of the MCP molecule was discovered in an effort to push dentistry to a new era of restorative possibilities—one characterized by materials that actively promote tooth health while also meeting the esthetic demands of smile-zone dentistry. By introducing MCP to the marketplace and to dental professionals across the world, we’ve taken an incredible leap to fulfill our mission of fundamentally improving dental care.”

Pulpdent’s MCP molecule will be marketed under the trade name Crysta. It will be immediately available in many of Pulpdent’s restorative products, including ACTIVA Presto, ACTIVA Pronto, and Lime-Lite Enhanced.

“Our research and development team has already begun studying the use of Crysta MCP technology in our extensive product portfolio,” says Pulpdent President Fred Berk. “We expect Crysta to quickly become a cornerstone of Pulpdent’s market success and a key differentiator in establishing standards for restorative treatment. We are at the beginning of the Crysta MCP story, and the next 10 years will see this technology shape dental practices and touch the lives of millions of dental patients in a very real way. We see the MCP patents as a once-in-a-generation development that can enhance the practice of dentistry and the longevity of tooth-color composite restorations.”

Currently, ACTIVA Presto and ACTIVA Pronto, the recently introduced, first-ever universal light-cure esthetic bioactive composites, and Lime-Lite Enhanced, Pulpdent’s market-leading cavity liner, contain MCP. The company plans to introduce MCP to additional materials, including both new and legacy Pulpdent products.

MCP's remineralization properties resemble those that occur in natural dental tissues. Dental restorative materials containing MCP stimulate hydroxyapatite formation and become "sealed" to healthy tooth structure. As a result, restorations with MCP act as a deterrent against secondary caries, a well-known cause of dental restoration failure.

Both in vivo and in vitro research by Pulpdent demonstrated MCP's novel ability to create nucleation sites for hydroxyapatite formation. Hydroxyapatite precipitation on the surfaces of composites was evaluated using attenuated total reflectance Fourier-transform infrared spectroscopy (ATR-FTIR), scanning electron microscopy (SEM), and energy dispersive spectroscopy (EDS).

Pulpdent's original research, which includes the achievement of MCP-containing materials that produce optimal esthetics (tooth shade matching) and flexural strength, was recently published in the peer-reviewed journal *Polymers*. The article, titled "Experimental Dental Composites Containing a Novel Methacrylate-Functionalized Calcium Phosphate Component: Evaluation of Bioactivity and Physical Properties," was authored by MCP inventors Sunny Skaria and Kenneth J. Berk. It may be found at <https://www.mdpi.com/2073-4360/13/13/2095>.

Pulpdent pioneered the introduction of esthetic bioactive dental materials in 2013 with the introduction of ACTIVA BioACTIVE-RESTORATIVE, which will continue to be a leading restorative material for the company. MCP technology works in concert with the mechanism that drives ACTIVA BioACTIVE-RESTORATIVE and other ACTIVA products. The bioactive ACTIVA line currently includes ACTIVA BioACTIVE-CEMENT, ACTIVA BioACTIVE Base/Liner, ACTIVA Kids BioACTIVE-RESTORATIVE, ACTIVA Presto, and ACTIVA Pronto.

Extensive independent research has validated the significance of bioactive restorative materials and their positive effect on patient outcomes. The field of bioactive research in dentistry continues to expand as methods of observing bioactivity and measuring bioactive-assisted outcomes becomes more highly developed.

By definition, bioactive dental materials stimulate the natural remineralization process that helps protect teeth against caries. Bioactive restoratives also actively promote a bonded layer of apatite between the tooth and restoration. Pulpdent's bioactive dental materials are acknowledged by the US Food and Drug Administration as meeting requirements to be termed "bioactive."

For more information on Crysta, visit <https://pulpdent.com/crysta>. For more information on ACTIVA Presto, visit <https://pulpdent.com/pulpdent-products/activa-presto>.

About Pulpdent—Pulpdent is a global dental research and manufacturing company established in 1947 and headquartered in Watertown, Massachusetts. Its first product, Pulpdent Paste, is still used universally today in vital pulp and root canal therapy. Pulpdent is a family-owned company with a proven legacy of investment in original dental research and new technologies, while also being a sought-after private label manufacturer. Pulpdent has achieved BPA-free manufacturing in its restorative products, and all products are produced in its Boston-area facilities. The company strives to earn the trust of the dental professionals; inspire clinicians with materials that advance the practice of dentistry; and help patients everywhere smile with confidence. Pulpdent is celebrating its 75th anniversary in 2022 and may be followed using @pulpdent, @pulpdentcorporation, and #pulpdent75.