Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Novel Chromatography Media

Caustic-stable, chromatography media for use in affinity chromatography

Overview

Traditional chromatography media often fail under the harsh, high-pH cleaning protocols required in modern bioprocessing, resulting in limited durability and increased costs. This technology introduces caustic-stable, rigid porous glass particles designed for affinity chromatography, enabling repeated cleaning with strong alkali without compromising performance.

The inventive breakthrough is the combination of silica-like rigidity and true caustic stability, overcoming the limitations of both standard silica and soft-gel alternatives.

Advantages

Exceptional Caustic Stability: Withstands repeated cleaning at pH 10–14, unlike conventional silica resins which degrade under these conditions.

Reusable and Durable: Maintains structural integrity and performance over multiple cycles, reducing replacement frequency and operational costs.

Controlled Pore Size and High Pore Volume: Enables efficient separation and high binding capacity for protein purification.
Silica-Like Rigidity: Supports high flow rates and pressure, making it suitable for industrial-scale operations.

Superior Chemical Stability: Outperforms soft-gel alternatives, which suffer from pore size variability and low chemical resistance.

Compared to existing chromatography media, this technology offers the durability of glass with the performance advantages of silica, without the drawbacks of soft gels.

Applications

Bio-therapeutic protein purification, including purification of monoclonal antibodies

Fast Protein Liquid Chromatography (FPLC)

Affinity Chromatography

Antibody Purification using Protein A

Technology Status

Development Stage: Laboratory validation completed; prototypes of glass particles produced and tested in affinity chromatography applications (approx. TRL 4–5).

Validation Status: Demonstrated caustic stability and reusability in simulated industrial cleaning protocols.

Key Milestones: Successful purification of protein therapeutics in lab-scale trials; compatibility with standard industrial sanitisation.

Market Opportunity

Target Industries: Biopharmaceutical manufacturing, protein purification, antibody production, industrial chromatography suppliers.

Market Size Estimate: The global chromatography resins market is projected to reach USD 3.7 billion by 2028.

Prevalence: The need for caustic-stable, high-performance chromatography media is widespread in bioprocessing, where FDA-mandated cleaning-in-place protocols are standard.

Unmet Needs Addressed: Solves the persistent challenge of media degradation and downtime caused by harsh cleaning, supporting the growing demand for efficient, large-scale protein purification.

Technology Sector
Physical Sciences

Opportunity
Research collaboration
Available to License
Further Development

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