Graphene Oxide Based Affinity Grids As Sample Supports For High- Resolution Cryo Electron Microscopy.

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INVENTORS

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OTHER INFORMATION

KEYWORDS

Microscopy, Cryo-EM

CATEGORIZED AS

- **Imaging**
  - Other

RELATED CASES

2018-085-0

INVENTION NOVELTY

Inventors at UCSF have developed a novel and economical method to produce a new generation of Cryo-EM sample grids that bind purify and protect biomolecule samples.

VALUE PROPOSITION

Elucidating biomolecule structure is integral to understanding disease. A high-resolution 3D structure offers insight into the interactions that drive biomolecule function and aids in the rational design of novel medical treatments. Transmission electron microscopy (TEM) is the method of choice for analysis of complex structures that can't be crystallized for x-ray crystallography and are too large for NMR techniques. The technique focuses a beam of electrons on a sample and the beam's interaction with biomolecules projects their image onto a detector. Cryogenic electron microscopy (Cryo-EM) utilities frozen, rather than solution-phase samples to minimize damage to delicate biomolecules.

Cryo-EM samples are prepared by applying sample solutions to a holey EM grid and then freezing them in process called vitrification. During this process, biomolecules can localize to the liquid-air interface where they denature and degrade. Sample degradation reduces homogeneity and leads to significant reduction in structure resolution. UCSF researchers have now developed chemically functionalized films of graphene oxide 1-2 atoms thick, that will either generally or specifically enrich binding the molecule of interest and protect it from destruction at the liquid-air interface.

Key Advantages

- **Reproducibility:** Cryo-EM sample grids can be coated with high-quality graphene oxide (GO) films of consistent thickness and with a high degree of coverage.
- **Low-Cost:** The method relies on low-cost materials, solvents, and technology.
- **Functionalization**: GO can be chemically modified to improve sample preparation and to capture and immobilize target biomolecules.
- **Versatility**: The method is compatible with a variety of Cryo-EM sample grid types and a variety of sample preparation strategies.

TECHNOLOGY DESCRIPTION

Cryo-EM sample substrate is coated with high-quality GO film using a proprietary method developed at UCSF. The resulting GO-film has excellent coverage and consists of a low-number of GO sheets. The film is then chemically modified to alter surface properties for either specific or non-specific sample capture.

LOOKING FOR PARTNERS

To develop & commercialize the technology as a manufacturing process for Cryo-EM sample grids.

STAGE OF DEVELOPMENT

Proof of Concept

RELATED MATERIALS

- A simple and robust procedure for preparing graphene-oxide cryo-EM grids - 07/11/2018

PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Novel Small Molecules to Prevent Neurodegenerative Diseases

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