# Process for Manufacturing Glass with Micro/Nanostrutured Surface Texture

Technology #14861

## Applications

Nanocone structured materials can be used for self-cleaning, anti-glare displays (e.g., glasses, windshields) and increasing solar panel efficiency. The material's unique structure allows for both antifogging and self-cleaning. This technology is a fabrication method for nanocone structures.

## Problem Addressed

Nanostructured materials are utilized for their superior optical and wetting properties, such as antireflection and superhydrophobicity/hydrophilicity. However, fabricating defect-free nanostructured surfaces with multiple functionality has remained a challenge. Conventional technologies use a single hardmask in the etching process, which limits the final height of the material to the material of the hardmask and its thickness. The proposed technology is based on multi-step plasma etching and uses shrinking masks to achieve more flexible choices in materials and thickness for better control of the height and profile of the nanocone structures.

## Technology

The key feature of this technology is its utilization of mask materials that are etched, but at a much slower rate than the substrate, which allows the tapered nanocone profile. By controlling the etching rate and size of the mask material, the nanocone structure is determined. These nanocones have the advantage of multifunctionality (i.e. antifogging and self-cleaning) because of their high aspect ratio.

## Advantages

- Anti-glare, anti-fog, self-clean
- Compatible and adaptable to conventional 2-D lithography techniques
- Both aspect ratio and profile of nanocone structure can be controlled

## Categories For This Invention:

Energy
Solar
Photovoltaics
PV Optics
Materials
Micro & Nanotech
Nanomaterials
Photonics
Displays

255 Main Street, room NE 18-501
Cambridge, MA 02142-1601
Phone: 617-253-6966 Fax: 617-258-6790
http://tlo.mit.edu
Contact the Technology Manager: tlo-inquiries@mit.edu

## Intellectual Property:

Process for making nanocone structures and using the structures to manufacture nanostructured glass
Issued US Patent
9,120,669

## Inventors:

George Barbastathis
Hyungryul Choi
Kyoo-Chul Park
Gareth McKinley
Jeong-Gil Kim
Chih-Hao Chang

## Publications:

Glass without Glare
MIT Technology Review
August 21, 2012
Through a Glass, Clearly
MIT News
April 26, 2012
Nanotextured Silica Surfaces with Robust Superhydrophobicity & Omnidirectional Broadband Supertransmissivity
American Chemical Society
April 08, 2012, 10.1021/nn301112t

## External Links:

BioSystems and Micromechanics (BioSyM) Inter-Disciplinary Research Group
http://web.mit.edu/smart/research/biosym/BioSyM%20-%20Home1.html
Non-Newtonian Fluid Dynamics Research Group
http://web.mit.edu/nnf/
Energy, Science, and Engineering Lab
http://meche.mit.edu/research/energy/

## Image Gallery:

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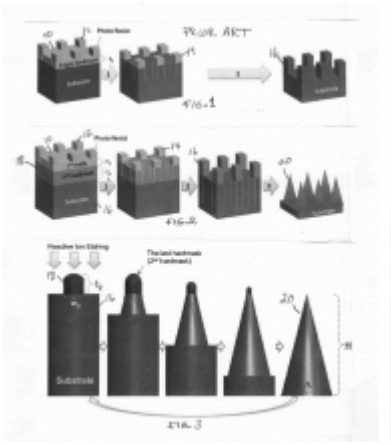


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