ROLL-TO-ROLL FABRICATION OF NANOSTRUCTURED FILM

RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 63/542,430, filed October 4, 2023, the content of which is incorporated herein in its entirety.

GOVERNMENT RIGHTS

[0002] This invention was made with United States government support under DE-AR0001761 awarded by the Department of Energy and 1916110 awarded by the National Science Foundation. The U.S. government has certain rights in the invention.

BACKGROUND OF THE INVENTION

[0003] Nanostructures have shown great promise in a variety of applications in energy transport, conversion, and storage, opto-electronics, nano-electronics, photonics, sensing, biotechnology, and medicine. A series of fabrication methods based on lithography, physical vapor deposition, chemical vapor deposition, chemical synthesis, electrochemical deposition, etc. have been developed to control the shape, size distribution, and surface chemistry of nanostructures. However, most of the methods are either costly or non-scalable. Roll-to-roll fabrication is a film-based scalable fabrication method that is a highly favorable approach for industry, while so far, the roll-to-roll technology for nanostructure fabrication is mainly based on nanoimprinting and lithography.

[0004] Therefore, a low-cost and highly controllable roll-to-roll templated deposition method for fabricating nanostructured films remains needed.

SUMMARY OF THE INVENTION

[0005] One aspect of the present application is to provide a method for fabricating a nanostructured film, comprising: