

Accepted Manuscript

Title: Controllable fabrication of large-area 2D colloidal crystal masks with large size defect-free domains based on statistical experimental design

Author: Yajuan Cheng Pär Jönsson Zhe Zhao



PII: S0169-4332(14)01208-2
 DOI: <http://dx.doi.org/doi:10.1016/j.apsusc.2014.05.167>
 Reference: APSUSC 27986

To appear in: *APSUSC*

Received date: 25-4-2014
Revised date: 22-5-2014
Accepted date: 23-5-2014

Please cite this article as: fabrication of large-area 2D colloidal crystal masks with large size defect-free domains based on statistical experimental design, *Applied Surface Science* (2014), <http://dx.doi.org/10.1016/j.apsusc.2014.05.167>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

fabrication of large-area 2D colloidal crystal masks with large size defect-free domains based on statistical experimental design

Yajuan Cheng, Pär Jönsson and Zhe Zhao**

* Corresponding author. E-mail address: zhezhaoy@kth.se, yajuan@kth.se

Department of Materials Science and Engineering, KTH Royal Institute of Technology, SE-100 44 Stockholm, Sweden.

ABSTRACT: A large-area hexagonal packed monolayer of silica spheres with consistent defect-free domains of a size larger than $3000 \mu\text{m}^2$ was prepared by spin coating on glass substrates with the assistance of experimental design and statistical analysis. The ratio of the defect-free monolayer area to the square of sphere diameter is nearly two times of the previously reported maximum values. Several parameters involved in the spin coating systems were investigated. The results indicated that the relative humidity and the rotational speed of the first step of the spin-coating had the most important impact on the ordering degree of the prepared monolayer. Furthermore, the ordering degree of the obtained monolayer increased with a decreased relative humidity. In addition, it reached an optimal value when the first rotational speed during spin coating reached a value of 1000 rpm. From this study, it can be concluded that statistical experimental design is an efficient strategy, especially for multi-factor phenomenon studies.

Download English Version:

<https://daneshyari.com/en/article/5356331>

Download Persian Version:

<https://daneshyari.com/article/5356331>

[Daneshyari.com](https://daneshyari.com)