In situ SU-8 silver nanocomposites

Nanocomposite materials containing metal nanoparticles are of considerable interest in photonics and optoelectronics applications. However, device fabrication of such materials always encounters the challenge of incorporation of preformed nanoparticles into photoresist materials. As a solution to this problem, an easy new method of fabricating silver nanocomposites by an in situ reduction of precursors within the epoxy-based photoresist SU-8 has been developed. AgNO3 dissolved in acetonitrile and mixed with the epoxy-based photoresist SU-8 forms silver nanoparticles primarily during the pre- and post-exposure soft bake steps at 95 degrees C. A further high-temperature treatment at 300 degrees C resulted in the formation of densely homogeneously distributed silver nanoparticles in the photoresist matrix. No particle growth or agglomeration of nanoparticles is observed at this point. The reported new in situ silver nanocomposite materials can be spin coated as homogeneous thin films and structured by using UV lithography. A resolution of 5 μm is achieved in the lithographic process. The UV exposure time is found to be independent of the nanoparticle concentration. The fabricated silver nanocomposites exhibit high plasmonic responses suitable for the development of new optoelectronic and optical sensing devices.

General information
State: Published
Organisations: Department of Management Engineering, Department of Micro- and Nanotechnology, Surface Engineering, Department of Physics
Contributors: Fischer, S. V., Uthuppu, B., Jakobsen, M. H.
Number of pages: 5
Pages: 1661-1665
Publication date: 2015
Peer-reviewed: Yes

Publication information
Journal: Beilstein Journal of Nanotechnology
Volume: 6
ISSN (Print): 2190-4286
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 3.32 SJR 1.119 SNIP 1.233
Web of Science (2017): Impact factor 2.968
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.86 SJR 1.138 SNIP 1.026
Web of Science (2016): Impact factor 3.127
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 3.05 SJR 1.001 SNIP 0.944
Web of Science (2015): Impact factor 2.778
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.67 SJR 1.163 SNIP 1.038
Web of Science (2014): Impact factor 2.67
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.56 SJR 1.268 SNIP 1.057
Web of Science (2013): Impact factor 2.332
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Scopus rating (2012): CiteScore 2.01 SJR 1.036 SNIP 1.004
Web of Science (2012): Impact factor 2.374
ISI indexed (2012): ISI indexed no
Web of Science (2012): Indexed yes
Scopus rating (2011): SJR 0.398 SNIP 0.469
Web of Science (2011): Impact factor 0.789