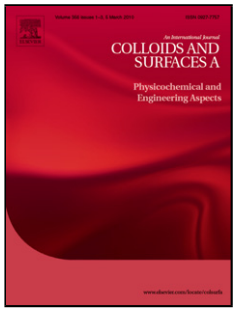

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PII: S0927-7757(17)30147-4
DOI: http://dx.doi.org/doi:10.1016/j.colsurfa.2017.02.020
Reference: COLSUA 21375

To appear in: *Colloids and Surfaces A: Physicochem. Eng. Aspects*

Received date: 30-11-2016
Revised date: 30-1-2017
Accepted date: 6-2-2017

Please cite this article as: Mohammed Hussein J.H.Al-Atia, Hayat K.Saeed, Asia R.Fliayh, Ali J.Addie, Investigating the effects of calcination temperatures on the structure of modified nanosilica prepared by sol–gel, Colloids and Surfaces A: Physicochemical and Engineering Aspects http://dx.doi.org/10.1016/j.colsurfa.2017.02.020

Investigating the effects of calcination temperatures on the structure of modified nanosilica prepared by sol–gel

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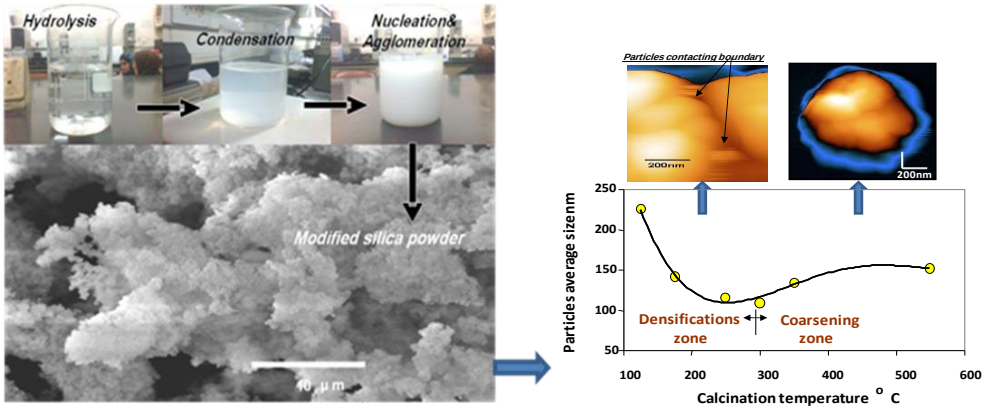
Graphical Abstract



Highlights

- The densification by calcination of the dried, modified silica powders prepared by a mixed alkoxide sol–gel method without using an ammonia catalyst or surfactants is the critical process affecting the powder structure characteristics.
- The calcination process between 125˚C and 550˚C directly contributes the changes in the average particle size and size distribution, particle densification, particle coarsening and the stability of the amino group intensity.
- The changes in the silica particle structure and morphology is explained within two decoupled zones, particle shrinkage by densification up to 300˚C, and growth by coarsening behaviours between 300˚C and 550˚C.