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Surfactant-free synthesis of high surface area silica nanoparticles derived from rice husks by employing the Taguchi approach

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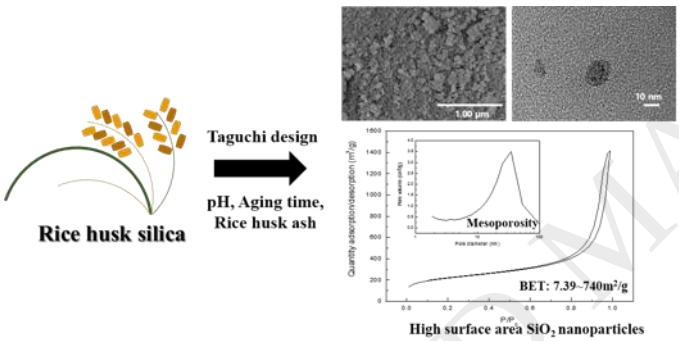
Graphical abstract



Highlights

- Surfactant-free synthesis of high surface area silica nanoparticle from rice husk (RH) by utilizing Taguchi method.
- Efficient optimization of factorial experiments drawing on the Taguchi method.
- Tuning the surface area of silica nanoparticles to maximum 740 m^2/g with particle size D_{av}=43.04 nm.
- Optimized conditions for high surface area nano silica were 300 mg of rice husk ash, pH 4 of titration and 7 days of aging time.
- Efficient time saving and quality control strategy to optimize the synthetic process; resulting silica nanoparticles with high surface area can be extended to biomedical and catalytic application.