PROJECT NUMBER

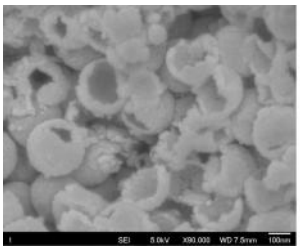
20285

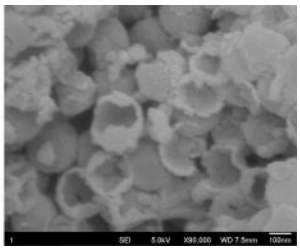
Cavitation-inducing agents for sonochemistry

Gas-trapping nanoparticles that function as both the source for cavitation and catalysis thereby creating a sonophotocatalyst. TiO2 fractured nanoshells (TFNs) are used as sonophotocatalyst.

Ultrasound-mediated catalysis (sonocatalysis) generates localised intense temperatures and pressures through cavitation, which accelerates catalytic chemical reactions under bulk ambient conditions. Although considered a green process, current methods use long ultrasound exposure times and high acoustic energies. Exogenous gas nuclei are often added to reduce the energy required, however spatial decoupling between cavitation events and catalysts remains and lowers reaction efficiency.

Applications: Wastewater treatment, catalytic oxidation, controlled radical polymerization, sonodynamic therapies





Features	Benefits
Novel gas-trapping nanoparticles that function as both the source for cavitation and catalysis allowing the gas bubble to be coupled to the catalyst	Removes spatial control limitations existing in current methods; Increases reaction rate; Increased efficiency due the cavitation happening near the catalytic site

Features	Benefits
The cavitation occurs at lower intensities using pulsed ultrasound	Reduce the energy requirement for cavitation; Particles remain intact during ultrasound irradiation and can sustain cavitation for several minutes; Possibility of recycling particles
Nanoparticle materials and structure tuneable for specific chemistries	Enhance and potentially create new catalytic sonochemical reactions; Can function as a radical initiator to minimise additives
Works with SonoCYL reactor (opportunity 20069)	Improved yields, specificity, and kinetics

Awaiting patent and Available for

- Co-development
- Consulting
- Licensing

To find out more, contact enquiries@innovation.ox.ac.uk and quote the project number.

The above information is provided ‘as is’ without conditions or warranties. Oxford University Innovation makes no representation and gives no warranty that it is the owner of the intellectual property rights in the technology described. © Oxford University Innovation Ltd 2026, Buxton Court, 3 West Way, Oxford, OX2 0JB.