

## Industrial Member Report Summary – Key Findings for Industry

### Development of Titanium Dioxide Coating by Suspension Spraying for Photocatalytic Applications

TWI Core Research Programme

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#### Industrial need

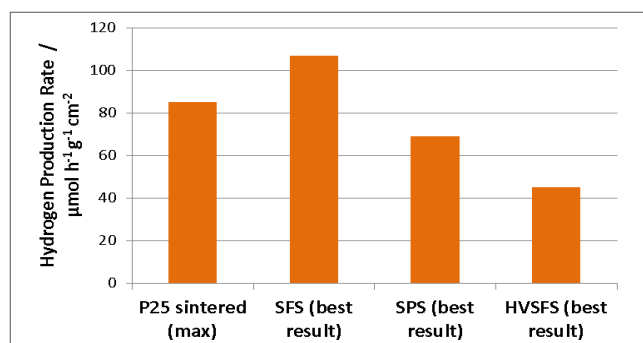
Suspension spraying, which uses nano-sized particles suspended in liquid as a spray consumable, is a relatively recent development in the field of thermal spraying. It enables coating properties that are inaccessible *via* conventional thermal spraying. A number of possible applications have been identified, including the production of anatase-rich titania coatings for application in air/water purification devices, photolysis devices for energy generation, and antimicrobial surfaces.

#### Key Findings

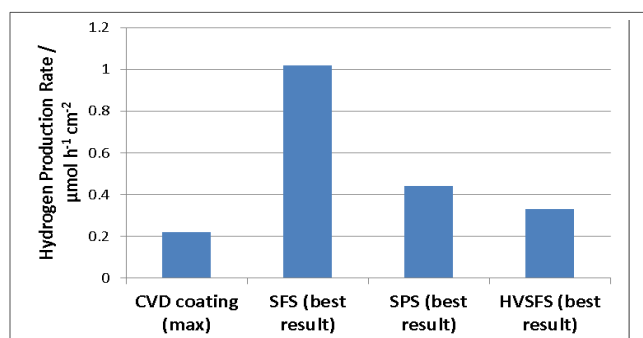
- Nanostructured coatings were produced by high-velocity suspension flame spray (HVSFS), suspension plasma spray (SPS) and suspension flame spray (SFS) techniques.
- Control over phase composition, a key requirement for photoactivity, was achieved.
- SFS was found to produce the most photoactive coatings, whilst also being the most appropriate suspension spray technique for up-scaling.
- The coatings were compared with published photoactivity values for a standard commercial material (P25). TWI's SFS coatings were significantly more active than P25.
- The coatings were compared with published photoactivity values for an alternative coating method, namely chemical vapour deposition (CVD). TWI's SFS, SPS and HVSFS coatings were all significantly more active than similar CVD coatings.

#### How to benefit from this work:

- As an Industrial Member of TWI, you have free access to the [full report](#)
- If you are not an Industrial Member of TWI, find out how your company could benefit from Membership [www.twi.co.uk/membership](http://www.twi.co.uk/membership)
- Read more at <http://www.twi-global.com/technologies/welding-surface-engineering-and-material-processing/surface-engineering/thermal-spraying/>
- Contact [Heidi.Lovelock@twi.co.uk](mailto:Heidi.Lovelock@twi.co.uk) to learn more



Hydrogen production rates, compared to published (Elouali *et al*, 2010) values for sintered P25 powder



Hydrogen production rate of the SFS, SPS and coatings compared to values for CVD coatings.