



# $\mu$ -Sq Beads

*“small things can change the world”*

*Daniel Lynch*

*Technical Director – Exilica Limited*



## ***Exilica Limited***

Formed in 2005 as a university spin-out company

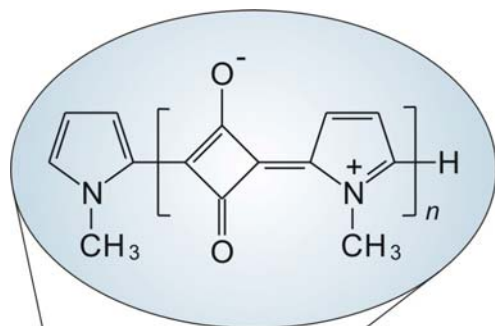
Partly owned by a large multi-national company

Currently involves a team of eight people

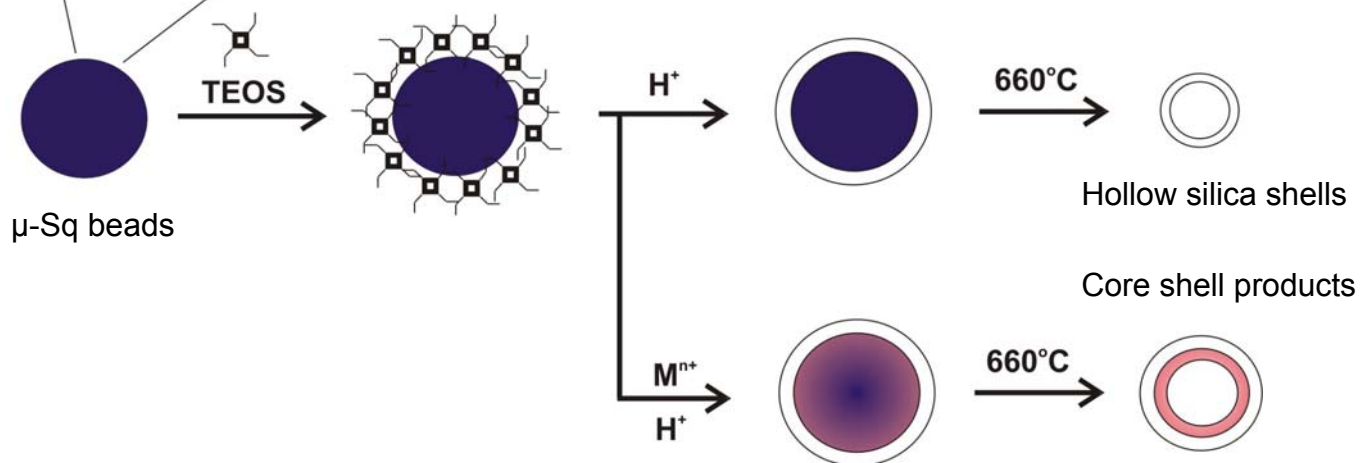
## ***Products***

- **$\mu$ -Sq beads** - micrometer sized spherical polymer particles
- sub-micrometer sized **Hollow silica shells**
- unique **Core-shell products** are also available

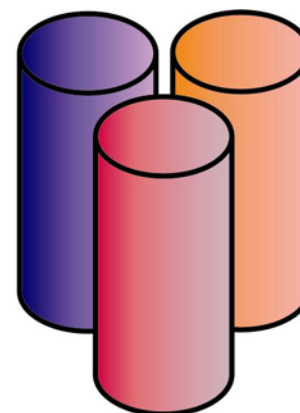
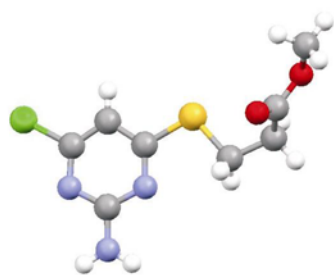
## Production methodology



*Langmuir* (2005) **21**, 6572 - 6575



## Applications

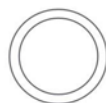


Innovative  
products

Novel delivery systems

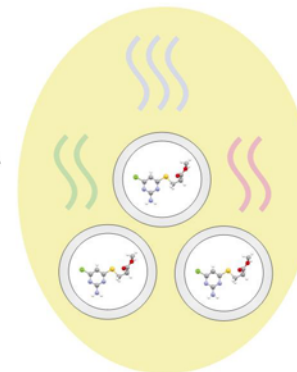


$\mu$ -Sq beads

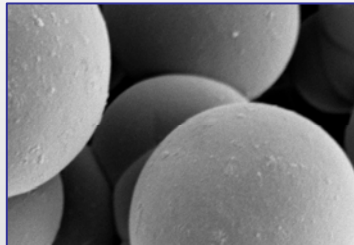
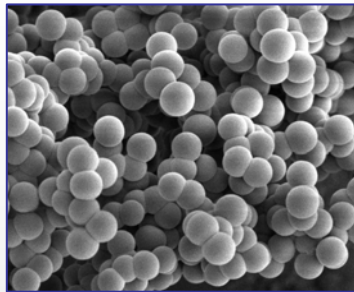


Hollow silica shells

Enhanced  
performance



## *$\mu$ -Sq beads parameters*

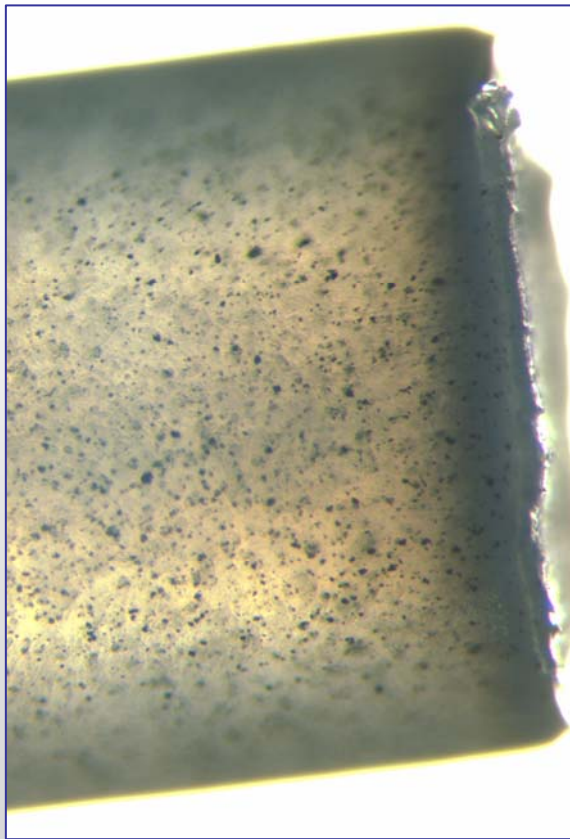


- particle size: 1.3 – 2  $\mu\text{m}$  diameter
- few beads with diameters up to 4  $\mu\text{m}$
- thermally stable up to 280°C
- mean nominal stress at rupture:  
493  $\pm$ 113 MPa
- mean deformation at rupture:  
+ 65% initial diameter
- particles are very porous

## *Porosity - $\mu$ -Sq beads*



## *Thermoplastic / rubber additives*



### **Compounding**

- easily dispersed
- $\leq 4\%$  w/w in thermoplastics
- $\leq 15\%$  in rubber

### **Colour considerations**

- $\geq 1\%$  colour  $\rightarrow$  black
- $< 1\%$  colour  $\rightarrow$  grey



## *Specific areas of commercialisation*

**Thermoplastics  
&  
Rubbers**

### **Fragrances**

- fragrancng environments
- masking chemical odours

### **Anti-bacterials**

- non-silver based
- increased variety





## ***Commercialisation strategy***

### **Direct approach → Automotive company**

- 3 year development project
- fragrancings / masking thermoplastics and rubbers
- company specific testing / evaluation

### **Indirect approach → Proof-of-concept project**

- produce marketing samples
- undertake performance testing / evaluation
- establish supply chain



## ***Products to market strategy***

### **Direct approach → Automotive company**

- Currently in the final year so both companies will spend the next 9 months tailoring exact product specifications / formulations

### **Indirect approach**

- Products we can arrange through our supply chain
- Joint development products in 'fragranced' plastics
- Value added products in plastics / textiles / rubber via joint development projects