

Particle stabilised emulsions studied by WETSEM technique

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Figure 1. WETSEM images for Tricaprylin-in-water (O/W) emulsion stabilised by 2 wt.% silica particles (diameter 988 nm) which are less hydrophobic. Notice the close-packed particles around the droplet edge.

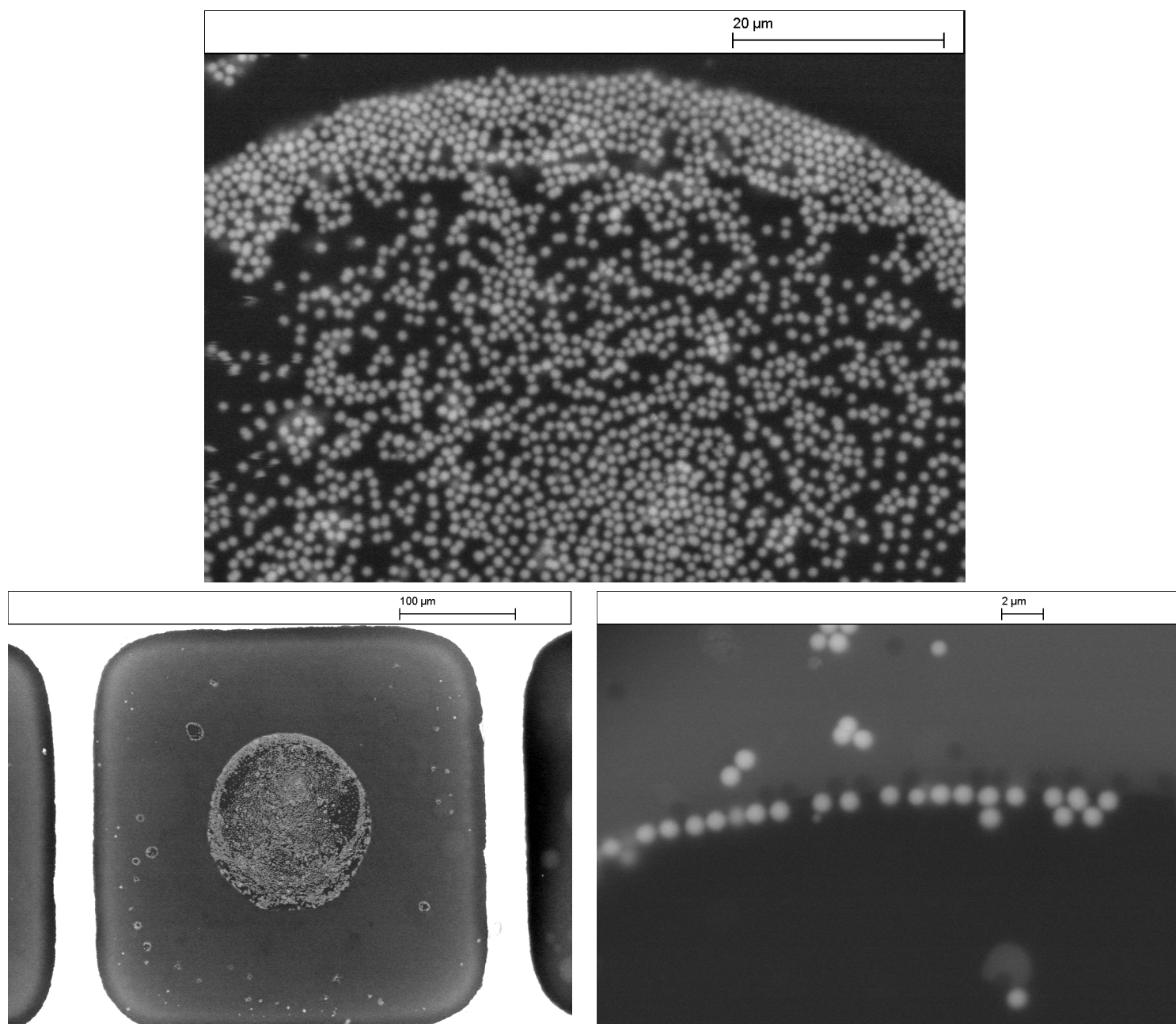


Figure 2. WETSEM images for Water-in-Tricaprylin (W/O) emulsion stabilised by 1 wt.% silica particles (diameter 2.2 μm) which are intermediate hydrophobic.

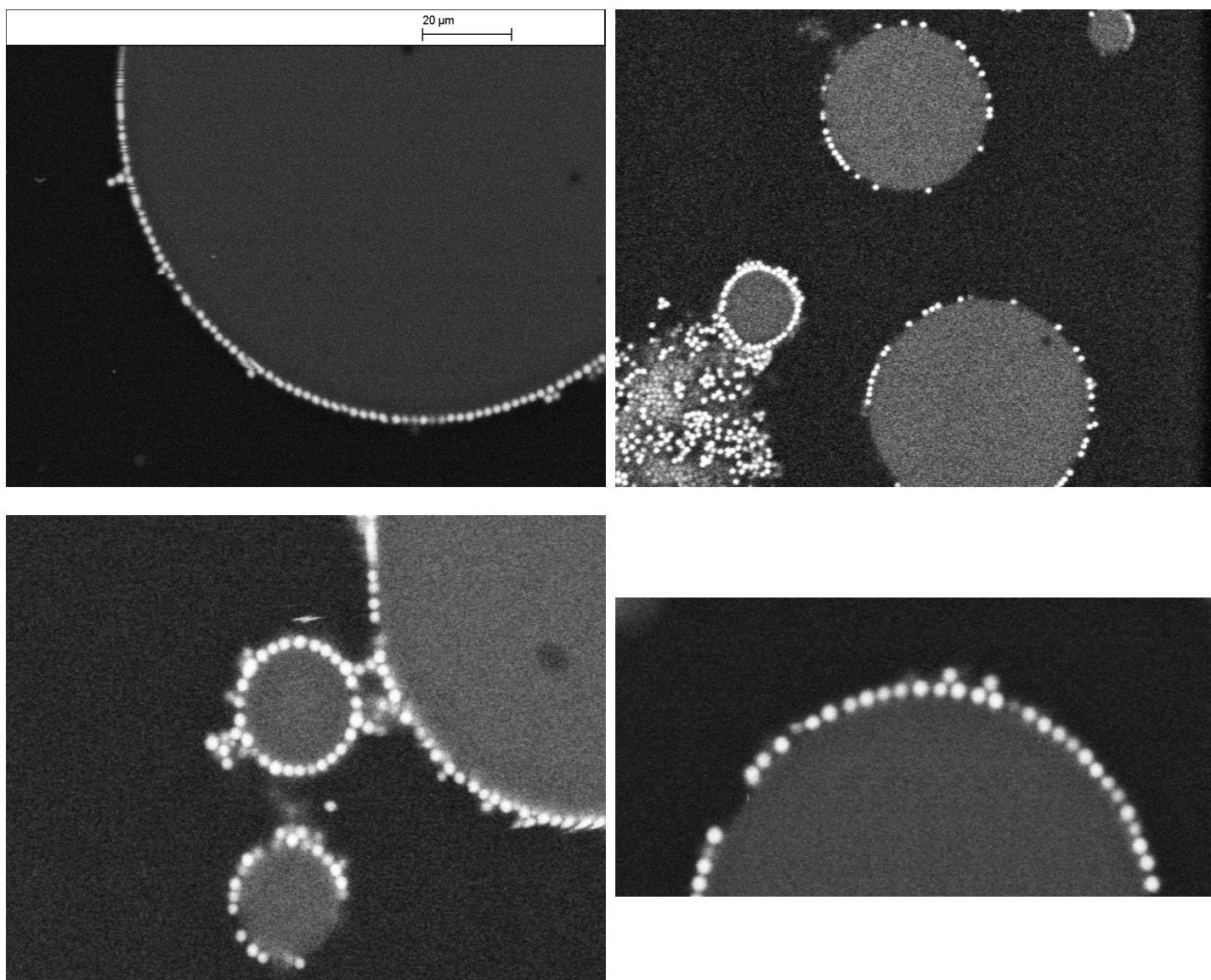
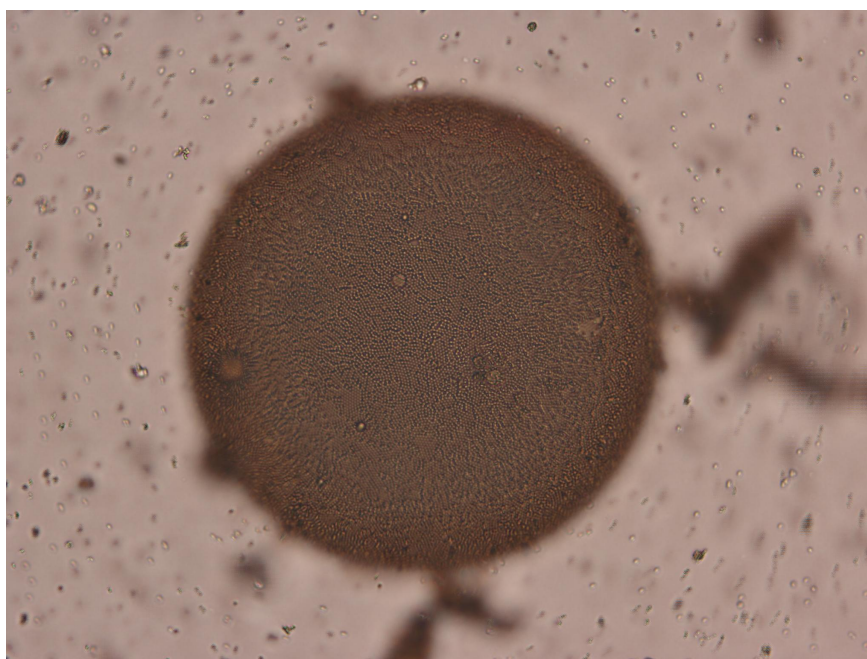
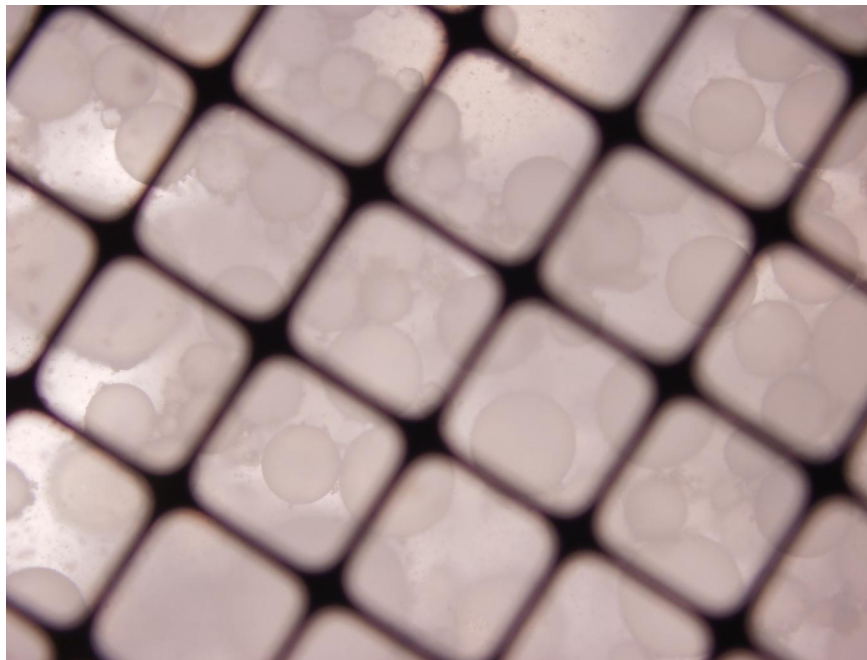


Figure 3. Optical images for Tricaprylin-in-water (O/W) emulsion stabilised by 2 wt.% PS latex particles (diameter 1.1 μm). Notice the closeness of emulsion drops to the membrane of the wetsem capsule.



Further details of the experimental procedures:

We have studied the structure and behaviour of emulsion samples using SEM (Carl Zeiss SMT Ltd, Model: EVO 60) applying solid-state 4-quadrant backscattered electron detector (BSE) in normal high vacuum mode. Initially, we used an electron gun voltage of 20KV, subsequently increased to 25KV. Also, an electron beam probe current of initially 200pA, subsequently increased to 500pA was used. And we carried out the following steps:¹

1. Preparation of fresh Pickering emulsion samples (o/w or w/o).
2. The capsule was placed in the multi-well plate, and the sealing stub was removed.
3. Applying 15 μ l of sample into the liquid dish of the capsule, and seal with the stub.
4. Place the hydrated capsule in the SEM holder.
5. Set the acceleration voltage to 25kV.
6. Initially, use the SE detector and focus on the metal support grid.
7. Once focused, change to the BSE detector.
8. It is recommended to start sample imaging with a slow scan speed (a few seconds per frame).
9. Increase contrast drastically. The grid should give a strong, white signal. Then move from the grid to one of the windows.
10. Obtain a slow-scan image of the desired part of the emulsion and save.

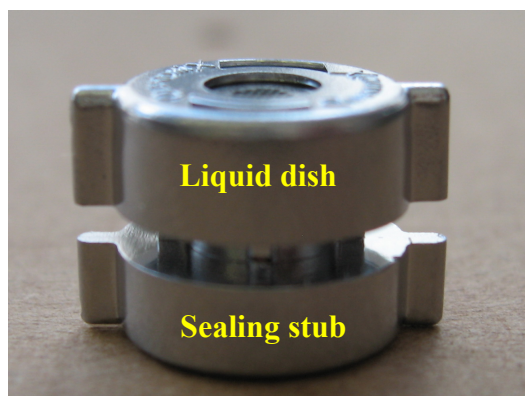


Figure 4. WETSEM QX120 capsule.