

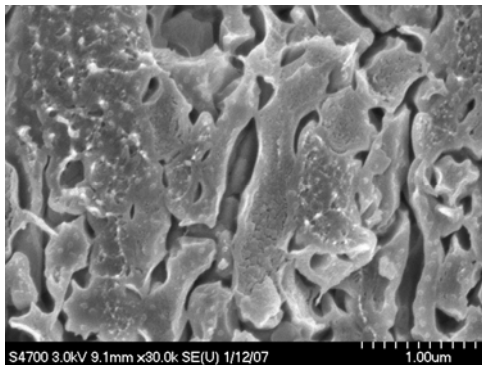
# Nanoporous Microbial Latex Coatings and Inks

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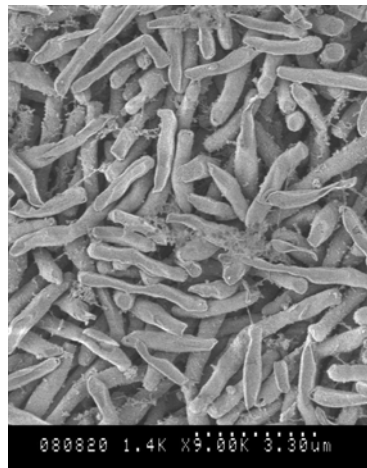
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## DESCRIPTION OF CURRENT WORK

- ◆ Cryo-FESEM imaging of nanopore structure of hydrated microbial adhesive latex coatings of photosynthetic microbes
- ◆ Development of a high pressure freezing (HPF) cryo-fracture method to visualize the pore structure of hydrated microbial latex coatings



Cryo-fracture FESEM image of a *Rps. palustris* latex coatings and HPF



Cryo-FESEM image of *Rps. palustris*

## MAJOR OBSERVATIONS

- ◆ Cryo-FESEM has previous been used to visualize the pore structure of a variety of nanoporous adhesive latex coatings containing reactive nongrowing bacteria (Flickinger *et al.*, 2007).
- ◆ A new project is development of photoreactive coatings that use latex-embedded photosynthetic bacteria or algae to generate hydrogen gas from wastes (Gosse *et al.*, 2007).
- ◆ Cryo-FESEM and HPF methods are being developed to visualize the pore structure surrounding latex-embedded *Rhodopseudomonas palustris*, a purple non-sulfur bacteria that produces hydrogen using nitrogenase under anoxic conditions.
- ◆ These methods will be extended to visualize the pore structure surrounding the microalgae *Chlamydomonas reinhardtii* embedded in polymer coatings. This algae produces hydrogen from water using hydrogenase.

## Recent Publications

- ◆ Flickinger et al., 2007. Painting and Printing Living Bacteria: Engineering nanoporous biocatalytic coatings to preserve microbial viability and intensify reactivity. *Biotechnol. Prog.* 23-2-17.
- ◆ Gosse et al. 2007. Hydrogen Production by Photoactive Nanoporous Latex Coatings of Nongrowing *Rhodopseudomonas palustris* CGA009. *Biotechnol. Prog.* 23, 124-130.