POLYANILINE CRYOGELS: SOFT AND CONDUCTING

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Polyaniline is important conducting polymer [1]. It is prepared by the oxidation of aniline with ammonium peroxydisulfate in acidic aqueous media [2] (Fig. 1). When the oxidative polymerization of aniline is carried out in the presence of a water-soluble supporting polymer in frozen reaction media, in ice, a composite hydrogels are obtained after thawing. Such hydrogels are called cryogels and the prefix "cryo" refers to the way of their preparation.

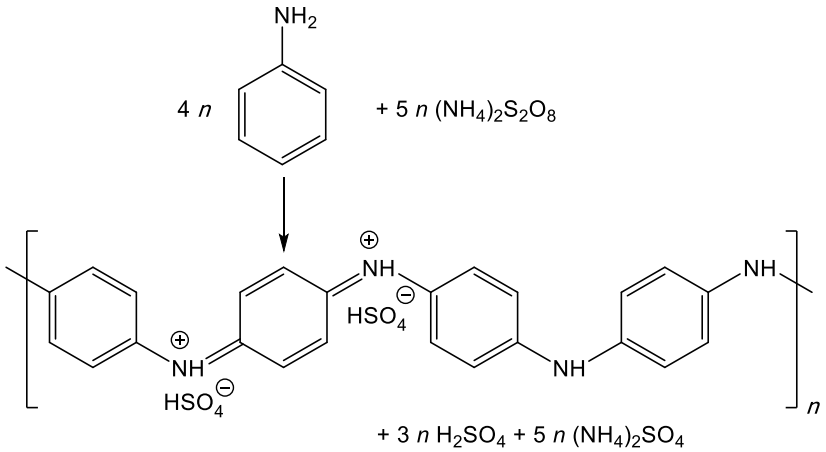

Figure 1 – The synthesis of polyaniline

The cryogels (Fig. 2) have good mechanical properties; they are soft, and conducting. While the conductivity of polyaniline is 4 S cm^{-1} [2], the conductivity of the hydrogel penetrated with dilute sulfuric acid solution is of the order of 10^{-2} S/cm. Such cryogels display both the electronic and ionic conductivity. The cryogels are macroporous, the pore sizes of freeze-dried being or the order of 10 μm (Fig. 3). The typical content of polyaniline amounts to a few per cent, the aqueous liquid phase constitutes most of the cryogel volume. Cryogels have also been conveniently characterized by Raman spectroscopy. They are likely to find uses in biomedical applications.

Figure 2 – Polyaniline cryogel: soft, flexible, conducting

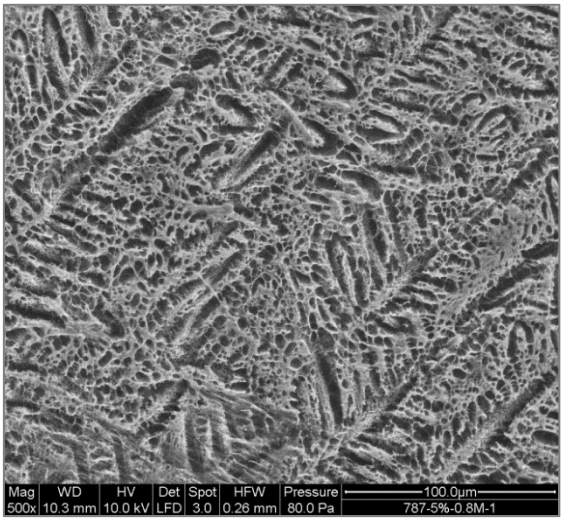

Figure 3 – Morphology of freeze-dried cryogel

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References

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