

4. Polyaniline. Preparation of a conducting polymer

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ABSTRACT

. In a "standard" procedure, aniline hydrochloride was oxidized with ammonium peroxydisulfate in aqueous medium at ambient temperature. The yield of polyaniline was higher than 90 % in all cases. The electrical conductivity of polyaniline hydrochloride thus prepared was $4.4 \pm 1.7 \text{ S cm}^{-1}$ (average of 59 samples), measured at room temperature. A product with defined electrical properties could be obtained in various laboratories by following the same synthetic procedure. The influence of reduced reaction temperature and increased acidity of the polymerization medium on polyaniline conductivity were also addressed. The conductivity changes occurring during the storage of polyaniline were monitored. The density of polyaniline hydrochloride was 1.329 g cm^{-3} . The average conductivity of corresponding polyaniline bases was $1.4 \times 10^{-8} \text{ S cm}^{-1}$, the density being 1.245 g cm^{-3} . Additional changes in the conductivity take place during storage. Aging is more pronounced in powders than in compressed samples. As far as aging effects are concerned, their assessment is relative. The observed reduction in the conductivity by ~10 % after more than one-year storage is large but, compared with the low conductivity of corresponding polyaniline (PANI) base, such a change is negligible. For most applications, an acceptable level of conductivity may be maintained throughout the expected lifetime