

ポリイミドマイクロ粒子の合成

Synthesis of Polyimide Microparticles

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本研究の目的はポリイミドのマイクロ粒子の合成である。一般的な合成方法ではテトラカルボン酸2無水物とジアミンを原料に等モルで高温で重合させ、ポリイミドの前駆体であるポリアミド酸（ポリアミック酸）を得た。溶媒はエチレングリコール、乳化剤はポリピロリドンを使用した。生成された粒子を電子顕微鏡で観察し、ナノスケールの表面構造を確認した。

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The topic of this research is to study the formation of polyimide particles similar to a published method by heating an ethylene glycol solution of the various diamines and dianhydrides for 24 h. The particle diameter and surface decoration should not only depend on the kind of diamine and dianhydride that was used, but also on the cooling rate, and other parameters. Furthermore, by this simple method it should be possible to produce hollow spherical polyimide microparticles that show a dense surface decoration with nanoscale polyimide particles.

A general synthesis method is shown in Figure 1. Both monomers were dissolved in ethylene glycol and kept at elevated temperature for several hours.

The SEM image of a 10 μm microparticle synthesized by this method shows a very fine nanoscale surface decoration (Figure 2 (left)). Other combinations, especially those with aliphatic amines, gave polymer particles with smaller diameter (1-2 μm diameter) and larger surface ornamentation (100 nm), as can be seen in Figure 2 (right)

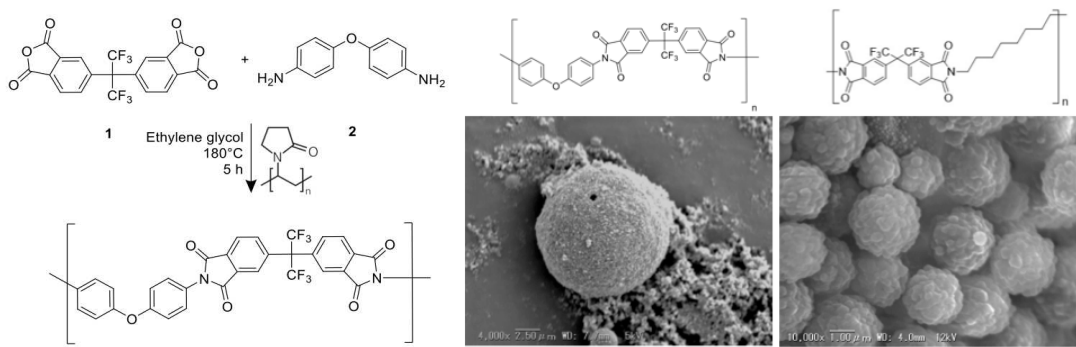


Fig 1. Synthesis scheme

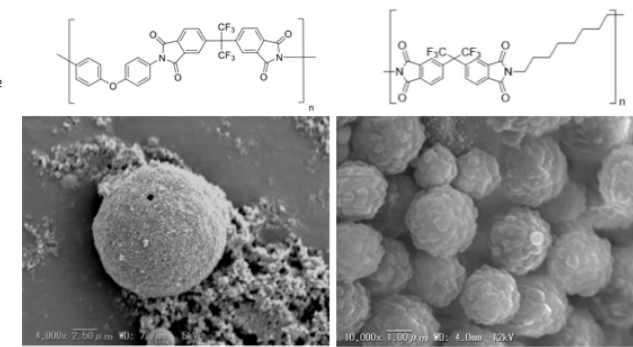


Fig. 2: Electron microscope images of two different polymers.

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