

研究论文

一系列单硅烷-寡聚噻吩共聚高分子膜中电荷传导研究

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摘要 研究了一系列由单硅烷和寡聚噻吩组成的共聚高分子膜(PS_nT , n 表示寡聚噻吩单元中噻吩环的个数)在较宽掺杂率范围内载流子的迁移率变化规律. 结果表明, 掺杂率极低($<0.2\%$)时各膜中的载流子迁移率接近, 几乎不受 n 的影响; 随着膜的掺杂率的增加, 各 PS_nT 膜中的迁移率相继增大, n 增大, 迁移率在更低的掺杂率处开始增大, 其增幅随着 n 的增加而增大. $PS_{14}T$ 迁移率的增幅超过4个数量级, 已与电化学合成的聚噻吩膜中观察到的迁移率增幅相当, 表明此共聚物中的 n -共轭长度已足以再现聚噻吩传导性能.

关键词 [迁移率](#) [寡聚噻吩](#) [共聚物](#) [电荷传导](#) [掺杂](#)

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Charge Transport Study of a Series of Monosilanylene-oligothienylene Copolymer Films

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Abstract Mobilities of charge carriers in thin films of a series of copolymers with repeat units consisting of monosilanylene and oligothiophene(PS_nT , n denotes the ring number of an oligothiophene unit) are measured over a wide range of doping levels. Mobilities of charge carriers in these polymer films coincide well with each other in the very low doping regions below a doping level of 0.2%. The mobilities for these copolymer films increase as the doping level increases. Mobilities for the polymers with larger n start to rise at lower doping levels. The mobility enhancement follows an increasing order of the n -conjugation length. For $PS_{14}T$, the enhancement exceeds 10^4 , close to that observed for electrochemically synthesized polythiophene, implying that the n -conjugation length in this polymer is almost sufficient to reproduce charge transport properties of polythiophenes.

Key words [Mobility](#) [Oligothiophene](#) [Copolymer](#) [Charge transport](#) [Doping](#)

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