

Synthesis and Characterization of Novel Poly
(Phthalazine ether ketone ketone) s

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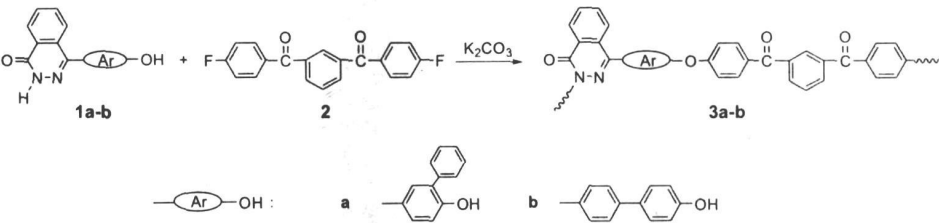
Abstract Two novel Poly (Phthalazine ether ketone ketone) s has been prepared from two phenyl groups substituted Phthalazine derivatives 1a and 1b and an activated difluoromonomer 2. The polymers exhibit high glass transition temperatures and excellent thermal stability.

Key words Poly (arylene ether ketone) s Phthalazine
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Aromatic poly (arylene ether ketone) s PAEKs which have exceptional thermal, thermooxidative and chemical resistance are widely used in aerospace and microelectronics. However, the semi-crystalline backbone of these polymers limit their applications, much work has been done to improve their processing properties and solubility^[1-2]. We have previously reported a series of Phthalazine containing PAEKs with pendant methyl group based upon several methyl substituted Phthalazine derivatives which exhibit excellent thermal

properties and good solubility^[3]. Nevertheless, these polymers displayed weaker thermal stabilities compared to unsubstituted counterparts. To further enhance the thermal properties of this class of polymers, we introduced herein the aryl substituted groups to the polymer mainchain taking into account of the improved thermal stability.

Scheme 1. Synthesis of Poly (Phthalazine ether ketone ketone) s 3a and 3b



As shown in scheme 1, the polymerization reactions involving two unsymmetrical heterocyclic bisphenol like monomers were carried out with 1, 3-bis (4-fluorobenzoyl) benzene and excess potassium carbonate in DMAc. The high molecular weight polymers 3a

and 3b were isolated as white fibrous materials with inherent viscosities of 0.84 and 1.02 dL/g and Mn for 3a and 3b are 62 000 and 127 000 respectively. In addition, the polymers were obtained in very good yield as shown in Table 1.

Tab 1 Preparation and Properties of Poly (Phthalazine ether ketone ketone) s 3a and 3b

Polymer	Yield %	η_{inh}^a dL/g	M_n^b	HDI	T_g / °C	T_{cl}^c / °C	T_{dl}^d / °C	800 °C Residue ^e %
3a	95	0.84	62 000	3.80	221	506	537	67
3b	96	1.02	127 000	2.28	239	519	551	67

^aThe inherent viscosities were measured at a concentration of 0.5 g/dL in chloroform at 30 °C. ^bDetermined by GPC (based on polystyrene standards). ^cTemperature of 5 % weight loss determined in nitrogen. ^dTemperature of 10 % weight loss determined in nitrogen. ^eChar yield calculated as the percentage of solid residue after heating from room temperature of 800 °C in nitrogen.

The thermal properties of polymer 3 a and 3 b are summarized also in Table 1. Both 3 a and 3 b have high glass transition temperature of 221 °C and 239 °C, respectively which might originate from the bulky unsymmetrical Phthalazinone architecture which would greatly restrict the rotation of polymer backbone. The polymer 3 b exhibits a distinct higher T_g than 3 a because of the extremely rigid molecular main chain with biphenyl architectures. It is not surprisingly that the polymer 3 a and 3 b exhibit excellent thermal stability: the initial decomposition temperatures are both higher than 400 °C and the 10 % weight loss temperature is higher than 507 °C. Obviously, the replacement of substituted aryl groups along the polymer backbone exhibit better thermal stability than their counterparts of

polymers with pendant methyl groups. The high residue yield of 67 % could further demonstrate the excellent thermooxidative properties.

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新型含二氮杂萘酮结构聚芳醚酮酮的合成与表征

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摘要: 通过苯基取代的二氮杂萘酮的衍生物 1 a和 1 b与活性的含氟单体反应合成了两种新的苯基取代的含二氮杂萘酮结构的聚芳醚酮酮。聚合物 3 a和 3 b的结构由 FT-IR与 NMR进行表征, 此类聚合物表现出很高的玻璃化转变温度和优良的热稳定性。

关键词: 聚芳醚酮酮; 二氮杂萘酮

中图分类号: O63

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两性木素絮凝剂用于污泥的调质处理

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摘要: 以木素为原料制备了两性絮凝剂 LSDC, 并将其用于污泥的调质处理。实验结果表明 LSDC可使污泥沉降速度提高至原始污泥的 1.25倍, 污泥的过滤比阻则降低至原始污泥的 40%左右, 泥饼含水率由 93%降低至 80%。两性木素絮凝剂在污泥调质处理中的应用为木素的高附加值利用提供了新的途径。

关键词: 木素; 调质处理; 污泥; 性能; 絮凝剂

中图分类号: X17