

SQ[®] Reactive Lignin

1. Brief Introduction:

The Biomass project of Shengquan (SQ) Group is according to the SQ own technology to make decomposition and transformation of the Reactive ingredients in the plant straw into Cellulosic ethanol, Reactive lignin and D-xylose, furfural etc. In this case, it can make the plant straw to be used



directly, other than waste more than billion years to make petroleum. The project has been declared 120 domestic and international patents successfully. Use the new development technology, SQ Group had already successfully get Cellulosic ethanol, Reactive lignin and D-xylose, furfural and other products in the biomass project. By the new technology developed by SQ, the plant straw can be used to produce a lot of valuable things rather than waste. SQ biomass project had already published more than 120 patents.

SQ[®] Reactive Lignin is a natural organic polymer material which belongs to the secondary metabolism of the plant and the main



component of the plant skeleton .SQ technology is extracted lignin from the plant skeleton with advanced preparation and extraction process, which had the benefits of high purity, moderate molecular

weight, Insoluble in water but soluble in organic solvents, also the lignin had a higher glass transition temperature. In the Molecular structure of the Lignin, there are some Reactive groups which include Aryl, Phenolic hydroxyl, Alcoholic hydroxyl, carbonyl, Methoxy, carboxyl etc., so that it can make some chemical reactions of Oxidation, reduction, hydrolysis, alcoholysis, acidolysis , photolysis , biodegradation , sulfonated, polycondensation or graft copolymerization .

2. Specifications of SQ[®] Reactive Lignin :

Items	Specification requirements	
	Solid Lignin	Liquid Lignin
Appearance	Brown Solid powder	Black Liquid
Moisture (%)	≤45	≤85
Conductivity us/cm2	≤1000	≤20000
PH(2% Solution)	-----	-----
Ash content %	≤1.5	≤2
Alkali insoluble % (dry basis)	≤5.0	/

3. The distinguishment between SQ Reactive Lignin and Lignin from pulping waste

Item	SQ Lignin	Lignin from pulping waste
Manufacturing Process	Preparation& extraction under a mild condition	Reaction under high temperature & pressure
Appearance	White with Yellow	Brown
Molecular Structure	Retain the natural molecular structure	Molecular structure is destroyed

reactive Group	The number and variety of reReactive	does not have a reactive
Molecular weight	800-5000 Evenly distributed	300-100000 Uneven distribution
Solubility	Insoluble in water, soluble in organic solvents	Soluble in water
Purity	>90%	50%-60%
Ash Content	<1.5%	10%-15%

4. Application areas

The SQ[®] reactive lignin and its derivatives have a variety of functionality, which Can be widely used in the petroleum resins, rubber tires, polyurethane, phenolic insulation board, a surface-active agent, carbon fibers, batteries, agriculture and biodegradable products etc.

1. Alternative agents of Petroleum products: Reactive lignin has a large number of reactive groups, for example: Phenolic hydroxyl group, alcoholic hydroxyl group, carboxyl group etc., which can be widely used in the field of polymer resin.

(1)、酚醛树脂行业：活性木质素能够有效减少苯酚等石油制品使用



量，同时根据添加量的不同能够有效改善产品的应用性能。如酚醛砂轮树脂中添加 15%左右的木质素不仅能够有效减少苯酚的使用量，同时能够提高砂轮的强度和耐磨度。

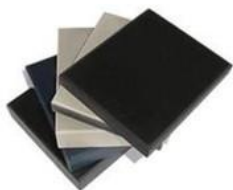
(1) Phenolic Resin: Reactive Lignin can effectively reduce the usage of phenol, meanwhile; the application performance of the product can be improved depending on the added amount of the Reactive Lignin. For example when added about 15% of the lignin in the Phenolic Wheel resin is not only able to effectively reduce the usage amount of the phenol, but also can improve the strength and abrasion resistance of the grinding wheel.

(2)、酚醛保温板行业：活性木质素能够有效减少酚醛树脂生产中苯酚的使用量，同时增加酚醛保温板的力学性能和阻燃性能。



(2) Phenolic insulation board: The Reactive Lignin can effectively reduce the usage of phenol in phenolic resin production, meanwhile, it can increase the mechanical properties and flame retardant properties of the phenolic insulation board.

(3)、环氧树脂行业：可以替代部分双酚-A，直接与环氧氯丙烷反应



制备环氧树脂或环氧树脂系胶结剂。使用量可根据性能需求，控制在 5-15%。

(2)Epoxy Resin: The Reactive Lignin can replace some of the bisphenol-A, and directly reacted with epichlorohydrin to prepare the Epoxy resin or epoxy resin cementing agent. The usage amount from 5%-15% based on the performance requirements

2、橡胶轮胎行业：由于活性木质素具有天然的苯环结构和抗氧化性，因此能够广泛应用于橡胶轮胎行业，提高橡胶制品的力学性能、抗老化性能、耐热性能和阻燃性。直接添加量一般控制在 5%-20%。利用活性木质素生产的橡胶树脂产品，具有比现有石油橡胶树脂无法比拟的优点。



2. Rubber Tires: Reactive Lignin has the natural structure of the benzene ring and oxidation resistance, so it can be widely used in rubber tires industry to improve the mechanical properties, anti-aging properties, heat resistance and flame retardance of the rubber products. Generally, the add amount is from 5% -20% .

3、聚氨酯行业：活性木质素含有酚羟基等活性基团，可以和异氰酸酯直接反应制备聚氨酯，同时木质素能够替代部分聚乙二醇生产生物基聚醚多元醇，广泛应用于聚氨酯行业。添加量可根据性能需求添加 5%-20%。



3. Polyurethane: The Reactive Lignin containing active groups such as phenolic hydroxyl, which can react with the Isocyanate to produce Polyurethane. And also the reactive Lignin can substitute the polyethylene glycol to produce bio- based polyether polyols. The usage amount is from 5%-20% based on the performance.

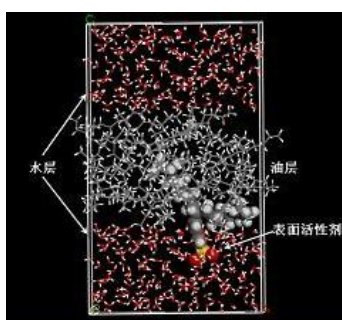


4、胶黏剂行业：活性木质素能够用来

生产木质素胶黏剂，能够显著减低酚醛树脂胶或是尿醛树脂胶的甲醛释放量。提高产品的环保水平和耐水性能。基于木质素的胶黏剂可用于面板如复合板、硬木板、中密度的纤维板或刨花板。

4. Lignin based phenolic resin Adhesives: The reactive Lignin can be used in the production of Lignin Adhesives, which can reduce the formaldehyde emission significantly during the production of Phenolic resin glue or urea-formaldehyde resin. The Lignin Based Adhesives can be used in Composite panels, hard wood, medium density fiberboard or particleboard.

5、表面活性剂行业：活性木质素或是活性木质素磺酸盐是一种天然



的阴离子表面活性剂和抗氧化剂，能够替代石油磺酸盐等石油制品表面活性剂广泛应用于石油三次开采、分散剂、润滑油和化妆品等行业。

5. Surfactant: The reactive lignin or Lignosulfonate is a kind of natural negative ion surfactants and antioxidants, which can be used in exploitation of oil , dispersants , lubricants and cosmetics industries widely to replace the petroleum sulfonate

6、碳吸附及其碳纤维行业：活性木质素是一种天然的高分子聚合物，

其中碳含量超过 50%。能够应用于木质素碳膜、纳米碳纤维和活性炭纤维等领域。



是一种全新的碳纤维原材料，能够实现碳纤维制品的高性能、民用化。

6. Carbon adsorption and carbon fiber industry: The Reactive lignin is a natural polymer, when the carbon content exceeds 50%, Lignin can be used in lignin carbon film, carbon nanofibers and activated carbon fiber areas. Lignin is a kind of new carbon fibrous material.

7、改性沥青行业：活性木质素保留了天然木质素的活性基团，能够



和沥青组分完全相容，木质素具有优良的耐紫

集团股份有限公司



外光老化的性能，是一种天然的抗氧化剂，通过木质素改性能得到性能良好、环保型的改性沥青。使用量可以控制在 5%-15%。

7. Asphalt Industry: The reactive lignin retains the reactive groups of the natural lignin, which can fully compatible with asphalt components, Lignin has excellent resistance to UV aging performance, and it is a natural anti-oxidant, after add Liginin in the asphalt , we can got good performance and environmentally modified asphalt. The add amount is from 5%-15%.

8、蓄电池行业：活性木质素或是活性木质素磺酸盐作为膨胀剂添加到蓄电池中能够提高储电性能和延长蓄电池的使用寿命，同时减少或是阻止氧化铅或是硫酸铅的产生。

8. Battery Industry: The reactive lignin or Lignosulfonate added into the battery as expansion agent can improve the electrical storage performance and extend battery life, At the same time to reduce or prevent the generation of lead oxide or lead sulfate.

9、可降解产品行业：活性木质素本身是一种可完全生物降解的高分



子聚合物，它能够部分替代价格昂贵的聚乳酸生产可降解塑料、地膜等产品。有效减少白色垃圾的数量。

9. Biodegradable products industry: Reactive lignin is a fully biodegradable polymer; it can partially replace expensive polylactic acid to produce biodegradable plastics, plastic film and other products.

10、农业领域：活性木质素或化学改性的活性木质素可以被用来做杀虫剂或除草剂的分散剂或乳化剂，且作为一种沉重的金属螯合剂。同时利用木质素可以生产有机缓释肥。提高肥料的有效利用率和肥效时间。



10. Agricultural fields: Reactive lignin or chemical modified reactive lignin can be used as dispersing or emulsifying agents in insecticide or herbicide, and also can be used as metal chelators. While taking advantage of the lignin can produce organic slow-release fertilizer, Increasing the effective utilization of fertilizers and fertilizing time