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# De e e a d A ca f F c a P e c Re

[illegible] *1 [illegible] *2

**Abstract:**

*Regarding three types of functional phenolic resins (Trisphenolmethane resin, Dicyclopentadiene type phenolic resin, Benzo, Benzo, Benzo,5.ETER 1products, heat resistance, dielectric properties, transparency, and the compatibility of rubber for tires were compared with the conventional phenol resin. The glass transition temperature of Trisphenolmethane resin is 35˚C higher than that of conventional resin, the dielectric constant and dielectric loss tangent of dicyclopentadiene type phenol resin are 20% lower than that of conventional resin, and thermal decomposition temperature of Benzoxazine is 54˚C higher than that of conventional resin and the dielectric loss tangent of Benzoxazine is 1/5 of that of conventional resin. In addition, the developed products have excellent transparency and compatibility with rubber, which is a material for tires. These functional phenolic resins are useful for a sealing material for power device of EVs and hybrid vehicles that require high heat resistance, a circuit board material for engine control units, an additive for reinforcing automobile tires, and a material for circuit boards of 5G smartphones and communication devices of mobile phone base stations that requires low dielectric properties.*

## 1. Introduction

[illegible]

[illegible] 200 C [illegible]

[illegible]

## 2. Properties and Applications of JFE Chemical's Functional Phenolic Resins

### 2.1

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C  , ,

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(  . 4 ( )).

B  p

[illegible] Figure 8 [illegible] 15 % [illegible] 15 % [illegible] 220 °C [illegible] 40 °C [illegible] 65 °C [illegible] 10). B [illegible] C [illegible] 2.2 [illegible] 2.4 [illegible]

C [illegible] (PP [illegible]) [illegible] PP 85 ([illegible] 85 °C), PP 95 ([illegible] 95 °C) [illegible] PP 115 ([illegible] 115 °C), [illegible]

## 2.5 Benzoxazine

B [illegible] 180 °C [illegible] ([illegible]) [illegible] 12). [illegible]

B [illegible] (Fig. 9). [illegible] 80 [illegible]