

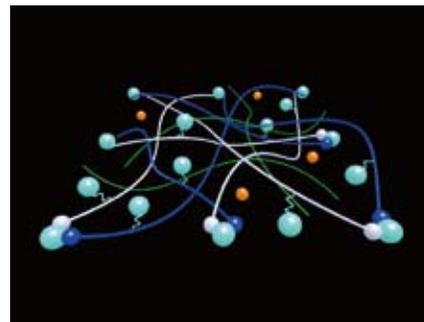
# The BluEarth-1: A New Standard for Fuel-Saving Performance

We marked a new phase in environmentally sensitive tires with the July 2010 launch of the first BluEarth tire. The BluEarth product concept provides for accompanying progress in reducing rolling resistance with advances in handling and in comfort and quiet. It is yielding a growing line of tires that save fuel, indulge drivers and passengers, and harmonize transport with the community, all at the same time.

The latest BluEarth tire, the BluEarth-1, debuted in Japan in March 2011 as our new flagship product in fuel-saving tires. It has earned the top designation under Japanese tire manufacturers' labeling standards for rolling resistance. In addition, it has become the first BluEarth tire to be sold overseas. We introduced the BluEarth-1 in Europe in April 2011, and we are preparing to market it in China and in North America.

The BluEarth-1 minimizes the traditional tradeoffs between low rolling resistance, on one hand, and wet grip and long mileage on the other. It surpasses in that regard even the DNA dB super E-spec, our former flagship product in environmental performance. The BluEarth-1 is superior to the DNA dB super E-spec in reducing external, "pass-by" noise, and it is fully comparable to its predecessor in handling stability and quiet ride.

Our BluEarth series includes the BluEarth RV-01, for minivans, and the BluEarth AE-01, available in sizes for a broad range of model types, as well as the flagship BluEarth-1. We will continue to augment the BluEarth series with new products to serve the growing global demand for fuel-saving tires.



*The chemical structure of the tread compound in the BluEarth-1.*

## **A remarkable polymer**

Contributing hugely to the BluEarth-1's fuel-saving performance is a newly developed polymer that we have incorporated in the tread compound. The polymers used in conventional silica rubber compounds are prone to heat generation when the tires are in



motion. That is because the ends of the polymer chains move freely in the compound, causing friction with the carbon and silica molecules. And the tire therefore loses some of its rolling energy to friction-generated heat.

The molecular chains of our newly developed polymer bond easily with silica molecules at their ends. That constrains the movement of the ends of the chains, which reduces friction between the polymer and silica molecules. It also helps distribute the silica evenly in the rubber compound, which minimizes friction between the silica molecules.

#### **Orange oil!**

Another important component in the BluEarth-1's tread compound is orange oil, which we have also used in other fuel-saving tires. Orange oil makes the rubber

more supple. It thus maximizes the area of tire contact with the textured contours of the road surface, which improves grip.

Yet another technological advance in the BluEarth-1 is the fine silica that we have adopted in the compound. Our fine silica has a greater specific surface area—surface area per unit of mass—than the silica in conventional tires. It therefore helps reduce tread wear.

Advances in compounding the tread rubber have thus enabled us to optimize the BluEarth-1 in regard to reconciling disparate performance criteria. Evidencing our success is the unprecedented combination of fuel economy, wet grip, and wear resistance.