Company

Asahi Kasei Corporation, Düsseldorf, Germany

Title project

New selectively hydrogenated SBR for 6PPD reduced usage

Main materials technologies involved

Selective hydrogenation, and microstructure control technology

Main goal or objective of the development project

This project aims to reduce the amount of 6PPD usage in rubber compounds, by improving the inherent ozone resistance of the rubber itself, while retaining the compatibility with other rubbers/materials.

Technical challenges addressed by the project team

6PPD(N-(1,3-dimethylbutyl)-N′-phenyl-p-phenylenediamine), widely used as an effective rubber antiozonant, is reported to transform into 6PPD-quinone to become toxic, resulting in the acute mortality in coho salmon.

To tackle with this problem, we considered it essential to reduce the 6PPD usage in the tire compounds without sacrificing the ozone resistance.

From the viewpoint of polymer structure, reducing the double bonds is an effective way as they are vulnerable to degradation against ozone. However, the simple reduction of double bonds from diene-based rubber can cause issues in the compatibility with other rubbers such as natural rubber and butadiene rubber, resulting in the poor physical properties.

Therefore, Asahi Kasei has developed a unique hydrogenation catalyst and a novel production technology to achieve the controlled selective hydrogenation of styrene butadiene rubber (SBR).

This technology makes it possible to balance the ozone resistance and the compatibility with other rubbers. Thus, Asahi Kasei’s new selective hydrogenated SBR enables the reduction of 6PPD without sacrificing the

ozone resistance and physical properties, thereby contributing to environmental protection.

What is the commercial status of the technology or product?

Our newly launched hydrogenated SBR is now being used and tested by many tire manufactures' worldwide and has received positive feedback.

Please describe the contribution of the technology or product to sustainability

Asahi Kasei's new hydrogenated SBR could contribute to reduction of 6PPD usage through improvement of ozone resistance.

Scope for further enhancements to the technology or product

The next goal is to reduce the energy dissipation, as well as to improve the durability performance, such as fatigue resistance and crack propagation speed.

Any further comments to further highlight the contribution of this development project to environmental sustainability?

Asahi Kasei's new selectively hydrogenated SBR may further contribute to longer tire lifecycle due to the chemically stable structure.