The 8th Green and Sustainable Chemistry Award

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"Development of high quality material recycling technology for vulcanized rubber"

This technology is a kind of manufacturing technology to produce the high quality reclaimed rubber while cutting only crosslinking point in cured rubber, which is usually said hard-to-recycle, in short period of time.

The cured rubber is considered as a kind of hard-to-recycle materials, then new recycling technology with better productivity and high quality is highly expected.

Authors have thought the weakest S-S bonds among C-C bonds, C-S bonds and S-S bonds in cured rubber. must be quickly broken when adequate energy is applied. This new technology enables to continuously produce high quality reclaimed rubber with a twin screw extruder, while cutting mainly S-S crosslink by applying suitable energy such as heat, pressure and shear stress. The manufacturing process is more simple and smaller space than those of existing Pan method and the processing time is greatly shrunk by one sixtieth of Pan method. Furthermore, human safety is improved thanks to its automated process.

Applying this devulcanization technology, thermo plastic elastomer can also be produced while devulcanizing, dispersing plastic resin and re-vulcanizing the reclaimed rubber dispersed in plastic resin again.

In terms of environmental aspect, land-fill disposal has been reduced by recycling the rubber waste within our manufacturing plant for more than 10 years. Also, this technology has been licensed to other manufacturers including tire manufacturer.

The amount of annual rubber waste exceeds more than 1 million ton. We hope this new technology helps to recycle those waste rubber and to establish resource circulating society.