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## **Recycling of Seat Cushions**

### **- Use of Polyester Cotton Cushion Material –**

Sejiro UMEMOTO  
Designing Department

This essay introduces the recycling of a high-elasticity seat cushion material (called polyester cotton cushion material) for vehicles, as an example of the recycling of polymer materials. This material is used for the seats of a new commuting train model “Series 21” designed for Kintetsu Corporation.

The Series 21 has been developed as a train car friendly to people and the earth. Conventionally, a seat cushion is manufactured by filling polyurethane foam and cattle hair felt on helical springs. An environment-minded feature of Series 21 is the use of easily recyclable polyester cotton cushion material, instead of the conventional material.

The polyester cotton cushion material is 100% polyester one. Accordingly, it is subject to a very limited extent of chemical deterioration at the molecular level, though elasticity decreases with the course of time. Technically, it is feasible to recycle the material in the form of reproduced polyester cotton cushion material. However, this involves some tasks to be fulfilled regarding cost aspects (e.g. the amount to be recovered, and plant manufacture). At present, a chemical recycling process to produce another material has been established and put to full-scale use.

This chemical recycling process is shown in Fig. 2.

First, PET\* is reduced to monomers through the crushing of molded products, the removal of impurities and other processes. Then, the monomers are remade as polymers (with a purity of 99.99%, which is at a level equal to that of the virgin product) for reuse. The polyester made through recycling is used for apparel and other textile products. A similar process can be used for re-recycling. In April 2005, 1,180 kg (a monthly feed) of polyester cotton cushion material was sent to a recycling plant to start chemical recycling into a new material.

Demand for polyester cotton cushion material, an environment-friendly material, is expected to keep growing.

\* PET: polyethylene terephthalate resin