

# Analysis of Recycled Glass-fiber Reinforced Nylon 6

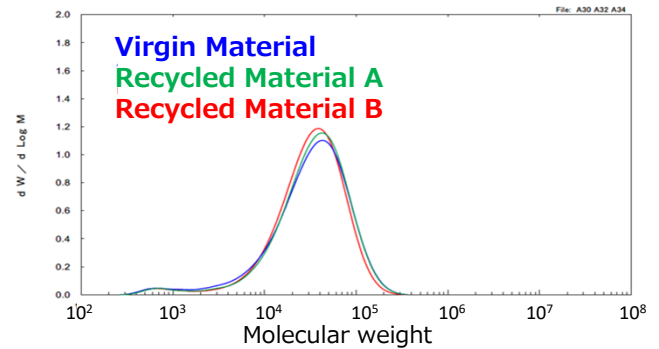
## ~ Impurity analysis ~

In the case that recycled polymer is used, some troubles (e.g. molding defects, discoloration) can be occurred due to polymer degradation and impurity. Structure change of polymer and degradation of additive in recycled Nylon 6 were investigated by several kinds of analytical methods.

### Samples 【Glass-fiber (GF) Reinforced Nylon6】

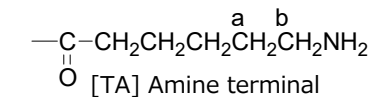
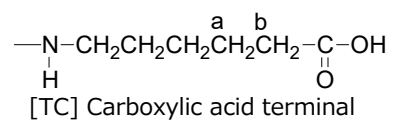
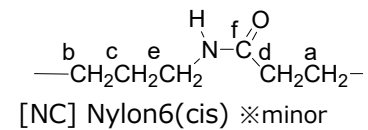
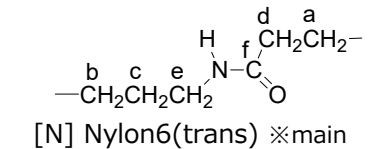
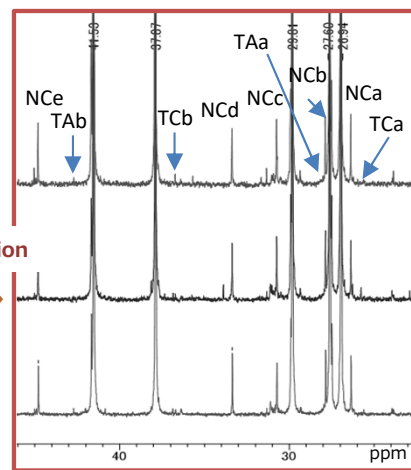
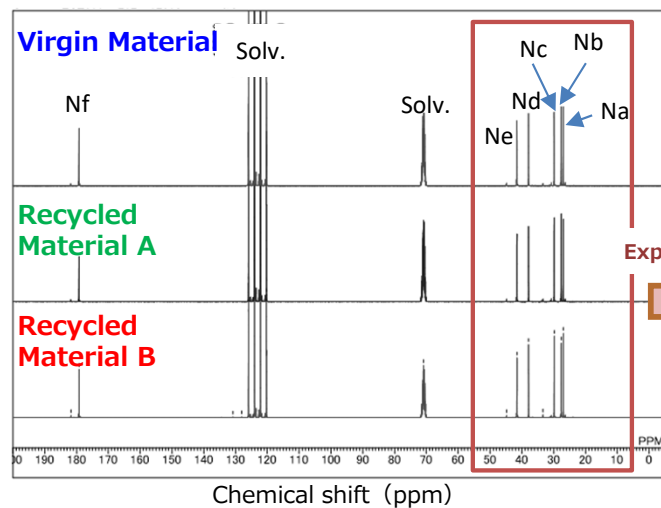
Sample name	Composition rate (%)		
	Virgin Nylon 6	Recycled Nylon 6	GF
Virgin Material	70	0	30
Recycled Material A	19	51	30
Recycled Material B	0	70	30

### Molecular weight distribution 【GPC】



✓ No remarkable difference in molecular weight

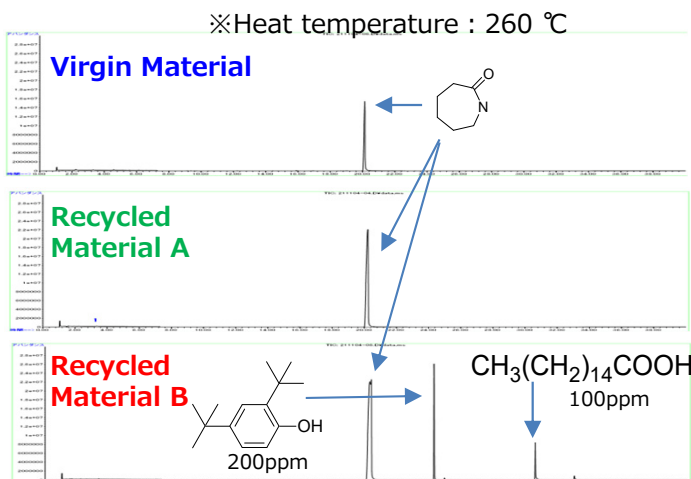
### Structure of polymer 【<sup>13</sup>C NMR】



✓ No remarkable difference in polymer structure (main and minor components)

### Gas generated during heating 【TD-GC/MS】

### Qualitative analysis 【High resolution LC/MS】



✓ Irgafos 188 was detected by using LC/MS in recycled material B

- No remarkable difference in polymer structure  
→ It was suggested that no decrease in strength due to the polymer was occurred.
- Some impurities were in recycled material B  
→ It can cause poor adhesion due to surface migration, poor molding due to gas generation and discoloration due to degradation product of additive

It is extremely important to check not only the mechanical properties but also the impurity information in advance to avoid troubles

✓ In recycled material B, decomposition product of additive and fatty acid were detected.