

Related Product : Cryogenic Sample Crusher JFC Series



Cryogenic Crusher
JFC-400

Study to shorten time for Crushing Polymer Samples

Keyword:

crushing in 12 sec., polymer additives analysis, heavy metal analysis, pretreatment apparatus

Introduction

JFC-400 is a cryogenic sample crusher which has been mechanically toughened and has very low noise level of 57 db, which is lower than that of usual human conversation.

This crusher is used as a pretreatment apparatus for analysis of additives and heavy metals contained in plastics, electronic components and printed circuit boards. Standard procedure of 10 minutes cooling by liquid nitrogen and 10 minutes crushing with Tungsten Carbide steel ball gives perfect pulverization, average particle size of 100 μm , with the following materials.

[Materials JFC-400 can crush well]

ABS, PAc, PS, HIPS, LDPE, HDPE, PP, PMMA, P(S-AN), Nylon 6, Nylon MXD, PC, PPS(Glass F. 40%), Hard PVC, Soft PVC, PTFE, PEEK, Silicone Rubber, Vulcanized IIR, Printed Circuit Board, Tire, Cellulose, Human Teeth, Hairs

Standard procedure takes 20 minutes per sample, but there are cases where crushing time is set much short depending on how samples are tested. So we have tried short-time crushing with some major polymers.

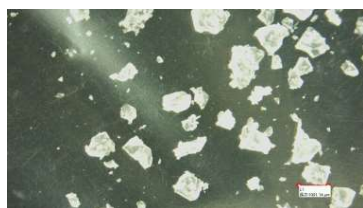
Experiment

We crushed 1 g each of the following polymers just for 12 seconds, instead of 10 minutes, after pre-cooling for 10 minutes as usual.

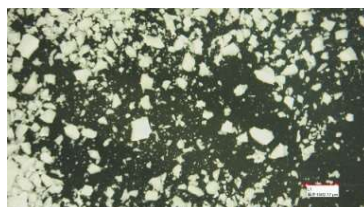
Results

Average particle size obtained were as follows:

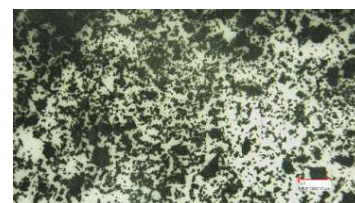
PS: 1,088 μm , Soft-PVC: 30 μm , PMMA: 378 μm , ABS: 1,069 μm , Nylon MDX6: 625 μm , PPS: 561 μm , Tire: 978 μm



Crushed PS



Crushed ABS



Crushed Tire

Conclusion

Some samples gave uniform particle size with much shorter crushing time of just 12 seconds. However, whether it is good enough or not depends on how such crushed samples are analyzed. So appropriate conditions have to be determined based on samples and analysis conducted afterwards.