

表1 炭黑颗粒尺寸和形态特征数据

项 目	炭黑N134	炭黑N234	炭黑N330	炭黑N660
粒子尺寸数据				
m/nm	17.01	21.31	26.32	50.63
sd/nm	4.91	5.21	7.23	13.24
w_m/nm	22.81	26.01	30.9	60.14
h_i	1.34	1.22	1.17	1.19
d_{sm}/nm	20.23	23.02	28.57	56.21
$\text{EMSA}/(\text{m}^2 \cdot \text{g}^{-1})$	164.77	144.8	116.67	59.3
M/nm	117.84	145.67	171.65	208.21
SD/nm	40.58	49.31	63.22	73.42
W_M/nm	166.64	199.69	244.96	288.64
H_i	1.41	1.37	1.43	1.39
聚结体形态特征数据				
S_t	1.59	1.61	1.46	1.31
H_t	1.68	1.66	1.56	1.53

3 结语

用TEM对炭黑成像,并用自主开发的炭黑形貌分析软件1.0分析TEM图像,获得炭黑颗粒尺寸和形态特征的量化统计数据。本方法测试的炭黑 m 与初级粒子粒径标称值相符,炭黑形态特征与实

表2 炭黑的SAST与EMSA $\text{m}^2 \cdot \text{g}^{-1}$

比表面积	炭黑N134	炭黑N234	炭黑N330	炭黑N660
STSA	136	110	80	41
EMSA	165	145	119	60

际相符,EMSA与STSA变化趋势相同。

本方法数据准确、可靠,分析手段高效、便捷。但炭黑形貌分析软件(第1版)仍存在一些不足之处,在今后将进行一些改进和提高。

参考文献:

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Analysis of Size and Morphological Characteristics of Carbon Black Particle by Transmission Electron Microscope

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Abstract: Analysis of the size and morphological characteristics of carbon black particle by transmission electron microscope (TEM) was carried out. The results showed that, using the morphology analysis method of carbon black by TEM and the software developed in this study, the average diameter of carbon black primary particle was consistent with the standard values, the morphological characteristics of carbon black was consistent with the actual structure, and the trend of electron microscope surface area (EMSA) was same as the statistical thickness surface area (STSA). This method provided accurate and reliable data, and analysis was efficient and convenient.

Key words: transmission electron microscope; carbon black; aggregate; primary particle; particle size; morphological characteristics

横滨橡胶开发超大型浮式气动橡胶护舷

中图分类号:TQ336.4 文献标志码:D

日本横滨橡胶有限公司宣布开发出世界上最大的浮式气动橡胶护舷,护舷直径达6 m。浮式生产储卸船系统(LNG-FPSO)必须能够高效、安全地在海上卸载和转移液化天然气(−160 ℃温度下

储存)运送船。横滨橡胶新开发的超大型护舷有助于提高液化天然气运送船卸载操作的安全性。

气动护舷是一种充气的减震橡胶制品,它漂浮在两艘船之间或船与码头之间,以防止船移动时对其他船体和码头造成的损害。超大型护舷可用于各种大型海上安全施工工作。

(钱伯章)