

A NEW APPROACH OF CONTINUOUS SYNTHETIC METHOD OF BUCKMINSTERFULLERENE

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RF(radio-frequency) thermal plasma system was used for the first time to synthesize buckminsterfullerene. The method is quite different from the conventional DC or AC arc ones in the points of charging and heating of raw-materials. The nominal frequency and maximum output power of the RF plasma are 4MHz and 35KW, respectively. Plasma temperature during processing was measured to be 16,000K at the center of plasma flame where graphite powder was passing through.

After systematic experimental survey on the various processing conditions, we have the confidence that this new method is applicable to produce fullerene with commercial base. Helium gas was more effective than argon gas as a carrier gas with respect to the yield of buckminsterfullerene(C60). The yield of C60 increased with RF thermal plasma power increasing. Net fullerene content was also dependant on the mean particle size of graphite powder. Maximum yield of C60 from the soot at the exit region of exhaust gas was 3.5% in solid to solid weight ratio. Though the yield is rather lower than that of the conventional methods, the method has a unique advantage in that graphite powder is fed continuously, and it provides a large scale fullerene production with less labour input.

We investigated whether any fullerene could be synthesized from an active carbon or not, at least in our experimental results, and it was observed that it was not synthesized from active carbon.

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