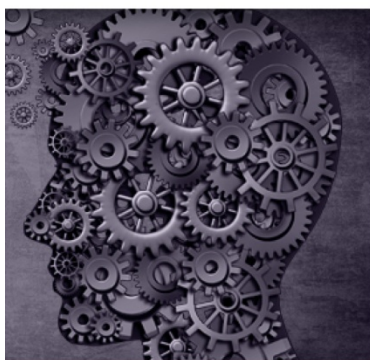


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## **Method for Mass Producing Large Fullerene Type Carbon Clusters Using Localized Heating Sources**

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### METHOD FOR MASS PRODUCING LARGE "FULLERENE" TYPE CARBON CLUSTERS USING LOCALIZED HEATING SOURCES

Disclosed is a method for mass producing the pure carbon molecules known as fullerenes by using localized heating of carbon under an atmosphere of inert gas. This heating may be accomplished by various means, including an electric arc, a laser beam, or by RF induction heating. The C60 and C70 molecules can be extracted by subliming them directly out of the carbon soot.

The large stable carbon clusters called fullerenes, and in particular C60 and C70, can be produced readily by evaporation of graphite under an inert gas atmosphere [1-3]. The use of localized heating, for example, CW laser or RF induction heating of the end of a carbon rod, allows a dense neutral carbon vapor to be produced in a clean manner. Preheating can be used to clean the carbon before vaporization. The combination of very clean conditions and a clean, controllable heating method allows fullerene production to be optimized.

Solvent extraction has been used to separate the fullerene species from the carbon soot [2,4]. However, the use of large quantities of solvent may be undesirable. An alternative process for extracting the C60 and C70 clusters is to directly sublime them from the raw soot [5]. This provides an effective initial purification step without requiring or introducing solvent and is comparable to solvent extraction in efficiency. Localized heating and direct sublimation together allow the entire production of C60 and C70 to occur with only carbon and inert gas present. Thus, the method allows large quantities of fullerenes to be produced with minimal contamination.

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