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## Electrodischarge technology and equipment to produce new carbon nanomaterials

Kuskova N.I.<sup>a</sup>; Dubovenko K.V.<sup>b</sup> ✉; Petrichenko S.V.<sup>a</sup>; Tsolin P.L.<sup>a</sup>;

Chaban S.O.<sup>b</sup>

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<sup>a</sup> Institute of Pulse Processes and Technologies, National Academy of Sciences of Ukraine, Nikolaev, 54018, pr. Oktyabrskii 43a, Ukraine

<sup>b</sup> Nikolaev State Agrarian University, Nikolaev, 54010, ul. Parizhskoi Kommuny 9, Ukraine

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### Краткое описание

A continuous and nonwaste process is proposed that consists of a set of simultaneous operations concerning the electrodischarge treatment of carbon liquid in reactors through exposure to high temperatures and pressures generated by a plasma discharge channel, the selection and separation of the processed sub-stance in filtering or centrifugal separating devices, and the recirculation of the purified material in a closed hydraulic system. The product, depending on the method used for the selection and separation, is a thick pasty mass or a dry powder mixture containing various modifications of carbon: fullerenes, nanotubes, and nanodiamonds (up to 10% of the total weight). A prototype of the electric equipment has been built to provide processing performance of from 0.02 to 1.5 kg/hour. It has a maximum installed capacity of 5 kV A, and the specific energy consumption ranges from 0.1 to 10 MJ/kg. The surge-current generator with microprocessor control was designed for industrial applications. It allows achieving the maximum discharge pulse recurrence frequency of 200 Hz, which is limited by the time of the medium's relaxation and the dielectric strength's restoration in the discharge gap. This ensures the versatile regulation and a shift in the corresponding processing performance of the single-reactor systems in the range from 0.4 to 30 kg/hour. This technology is complemented with the developed method for the enrichment of the produced ultrafine powder. It consists of an original sequence of physical and chemical methods (magnetic separation, acid treatment, chromatographic purification, etc.) and can increase the targeted selectivity of the processed products. © 2013 Allerton Press, Inc.

### Ключевые слова автора

carbon nanomaterials; electrodischarge technology and equipment

Включенные в указатель ключевые слова

### Контролируемые термины инженерии

Chromatographic analysis; Electric discharges; Electric equipment; Energy utilization; Filtration; Hydraulic equipment; Industrial applications; Magnetic separation; Nanodiamonds; Nanostructured materials

### Неконтролируемые термины инженерии

Carbon nano-materials; Chromatographic purification; Dielectric strengths; Microprocessor control; Processing performance; Simultaneous operation; Specific energy consumption; Technology and equipments

### Основной заголовок инженерии

Carbon

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✉ Dubovenko, K. V.; Nikolaev State Agrarian University, ul. Parizhskoi Kommuny 9, Ukraine; эл.

почта:dubovenko2010@gmail.com

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### Цитирования в 4 документах

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