Physics > General Physics

Clouds of short-circuited thermionic nanobatteries and promising prospects for development of nanobattery-based aerosol fusion reactors. The preliminary report

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The physical mechanisms of periodic separation and relaxation of electric charges within aerosol particles possessing the properties the short-circuited batteries can be extremely diverse. With use of appropriate materials and dispersing methods, the electrochemical, thermoelectric, thermionic, pyroelectric, photoelectric, photo electronic emission, or even radionuclide-based emission micro and nano-batteries can be synthesized and be dispersed in the air as clouds self-assembed of the short-circuited aerosol batteries due to the inter-particle electromagnetic dipole-dipole attraction. Intense thermionic emission from ionized hot spots migrating on the relatively cold surface of charged explosive particles, can convert these particles into short-circuited thermionic batteries, turning an aerosol cloud consisting of such unipolar charged, gradually decomposing explosive particles into ball lightning. The slow exothermic decomposition of the highly sensitive explosive aerosol particles, catalyzed by excess ions on their surface, and also ion-catalyzed reactions of slow water vapor induced oxidation of charged combustible aerosol particles underlie two main classes of natural ball lightning. At the same time, the artificially generated clouds consisting of such unipolar charged aerosol nanobatteries, probably, can have some useful applications, not only military ones. In particular, it seems that high-performance pyroelectric fusion reactors could be created on the basis of such ball-shaped aerosol clouds self-assembled of pyroelectric nanocrystals - short-circuited pyroelectric nanobatteries.

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