Summary of the Advanced Diamond Device Project

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The Advanced Diamond Device (ADD) project was successfully carried out from 2005 to 2007 as a national project in Japan. The target of the project was the realization of products and the target was achieved by the effective collaboration of all the participating institutes. Three different products, namely, a cold-cathode fluorescent light (CCFL), a small electron source and a high-frequency transistor, were set. The CCFL and small electron source were successfully realized. Operation at 40 GHz was confirmed for the high-frequency transistor. To support the above-mentioned practical development, research on two basic issues, namely, doping and interface/surface performance, was successfully performed. Additional research, which was not scheduled initially, was also performed. The contribution of these results and activities to diamond technology is quite significant because they show the possibility of utilizing the electron emission characteristics of diamond in two different devices and progress in elemental technologies used for device fabrication. The development of these products will continue but many problems still remain to be solved for the wide application of diamond in electronics.

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