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DNA-Associated Synthesis of Gold Nanoparticles by Gas-Liquid Interfacial Pulse Discharge Plasma QIANG CHEN, TOSHIRO KANEKO, RIKIZO HATAKEYAMA, Department of Electronic Engineering, Tohoku University — A gas-liquid interfacial discharge plasma is used for the DNA-associated synthesis of water-soluble gold nanoparticles (AuNPs) by reducing gold (III) from aqueous chloroauric acid trihydrate. The plasma is generated by a pulse power source, which can avoid the instability of DC discharges at high pressures. The high discharge current (∼ampere) offers a basis for the high rate synthesis of AuNPs. Single-stranded DNA is used as the stabilizing agent since DNA molecules can be bound to the gold surface. A red shift of surface plasmon resonance (SPR) absorption of AuNPs is observed when the DNA-stabilized AuNPs are mixed with a solution including complementary DNA, which means there is aggregation of AuNPs due to the hybridization of DNA. We also synthesize AuNPs associated with various kinds of DNA such as 30-base guanine G_{30}, adenine A_{30}, cytosine C_{30}, and thymine T_{30}. It is found by comparing the intensities of SPR peaks of AuNPs after extracting them from as-synthesized samples by centrifugation that G_{30} and A_{30} DNA have stronger stabilizing ability for AuNPs than that of T_{30} and C_{30} DNA.

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