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High Frequency ICP Source for HDPCVD JEUNGHOON HAN, DAEBONG KANG, JINHYUK YOO, JUSUNG — We have developed the high frequency source with a parallel antenna for HDP CVD. In the high frequency source, we have obtained the following results. The low capacitive voltage applied to antenna could minimize capacitive damage and reduce particles from ceramic dome covering chamber. The high frequency source made lower electron temperature than low frequency (400 KHz or 2 MHz), which can minimize plasma damage on the wafer. The plasma density from this source is from 10E11 to 10E12 per cubic volume and the electron temperature is less than 4 eV in 13.56 MHz. And the antenna of the low impedance reached easy impedance matching in 13.56 MHz. This source can be easy plasma strike and stable operation at low pressure (under 1mTorr) because of using High Frequency Source. It has been proven that it was improved gap fill at lower pressure. This result is due to longer mean free paths at lower pressures. Lower pressure than 1mTorr can be made a high-conductance chamber. Also, it is important to have the symmetrical pumping system for improved gap fill performance within wafer. The process characteristic of HDP CVD has proven in 0.065 μm technology with AR (aspect ratio) 6:1 and will has expected that the gap fill solution of the next generation device.

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