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Control the standing wave effect by increasing low frequency source power. EUNJEONG KIM, Samsung Electronics — We make metal lines along the circuit patterns of semiconductors. We faced one problem in the process of etching this metal line. The depth of metal line was deep at the center of wafer. This phenomenon reduced the separation distance between the metal line and the contact hole, which led to leakage current. The standing wave effect is the cause of this phenomenon. We etch the wafer in a CCP Chamber using a symmetric electrode. The standing wave effect is formed whenever two progressive waves of same amplitude and wavelength travel in opposite directions and superimpose. The electron density is highest at the center of the wafer where this wavelength overlap. So the etching amount at the center is peak. The source power we use is 13MHz and 100MHz . Wavelength is inversely proportional to the frequency of the source power. The lower the frequency, the greater the wavelength. As a result, the standing wave effect is reduced and the electron density in the chamber becomes uniform. We tried to research a best 13MHz source power to reduce the standing wave effect. As a result, We improved the depth dispersion of the metal line between the center and edge points of the wafer was improved by 50 percent.

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