

## **Graphite Susceptors For Single Crystal Silicon Grown Using Czochralski Process.**

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Graphite is a high temperature material that finds many applications in the hot zones to grow single crystal silicon using Czochralski process. Some of the graphite parts in a typical hot zone include heaters, heat shields and graphite crucibles. Depending on the hot zone part, the property requirements of the graphite varies. Property such as specific resistance of graphite is important for heaters while mechanical properties are important for graphite crucibles. Graphite crucibles, which are also called susceptors, are one of the most important hot zone parts. They provide mechanical support to fused silica crucibles since fused silica crucibles can not maintain the mechanical rigidity at temperatures higher than melting point of silicon. The graphite crucibles or susceptors are consumables as they react with silica to form silicon monoxide (SiO), silicon carbide (SiC) and carbon monoxide (CO). Silicon carbide formation introduces stresses and deforms the graphite crucibles. In order to reduce this reaction, certain graphite properties have to be optimized. At MEMC Electronics Materials, Inc, systematic studies have been conducted to understand the effect of material properties of graphite on the reactivity of graphite with fused silica. The reactivity testing is conducted in the vacuum furnace using graphite and fused silica samples. The test involves heating the samples to 1500 ° C or 1650 ° C for 24 or 48 hours in a vacuum of 10 to 20 torr. The weight loss of graphite and fused silica samples is monitored. In this poster, results of the reactivity testing are presented. Graphite material properties such as density and permeability are found to be very important to control the reactivity between graphite and fused silica. The results of this testing are used to develop the suitable graphite grade material.