
Silicon Value Chain

Light from the sun can be converted to electrical energy using photovoltaic systems that comprise cells made of semiconductor materials. When the sunlight hits the cell some electrons are dislodged and this creates an electrical current or flow of electrons. The most common cell material, at present, is Silicon and this accounts for some 90% of solar cells. Crystalline Silicon is formed by a process that begins with refining and smelting quartz sand and finishes with a silicon wafer installed in a solar module. Along this "Silicon Value Chain" graphite and carbon materials are widely used. The properties of Graphite that cause it to be resistant to high temperatures, aggressive gases and corrosive chemicals make it an ideal material for use in these processes.

Graphite electrodes can be used in the first refining process to produce metallurgical silicon after which it is converted to a gas that is then condensed in reactors forming super pure Silicon. In these reactors are found many graphite parts vital to the production of the polysilicon. Following this the silicon is cast into ingot forms from where silicon wafers are cut to be made into solar cells or silicon chips. The ingot casting machines use graphite and carbon parts for containment, heating and insulation of the molten Silicon.

The material used to make solar wafers is further processed to enhance the light absorption rate and cc composite materials are used to carry the wafers through the coating equipment.

Tokai Carbon is providing graphite and carbon materials that are used across the whole Silicon Value Chain.

