

Trade Press Release

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Heraeus Photovoltaics Features their SOL9620 Series and the SOL9621 Series at Intersolar N.A. 2014

- **Up to 0.25% efficiency gains demonstrated on 110 Ω /sq. monocrystalline wafers**

The Heraeus Photovoltaics Business Unit will feature two new front-side metallization pastes for c-Si solar cells during the Intersolar North America 2014 at the Moscone Center in San Francisco, California on level 1 in Booth 7611 from July 8th through 10th. The SOL9620 Series and SOL9621 Series represent Heraeus' latest pastes that enable cell manufacturers to further increase their c-Si cells' conversion efficiencies to an industry-leading level and beyond. The development of these two products are for customers with slightly different LDE applications and processing; however both pastes provide superior cell efficiencies while lowering customers' cost per watt.

The SOL9620 Series is outstanding for ultra-lightly doped emitters [ULDE], with surface doping concentrations down to $1 \times 10^{20}/\text{cm}^3$. The SOL9620 Series has demonstrated the highest performance during customer testing, particularly on monocrystalline wafers. Relative to the SOL9610 Series on 110 Ω /sq. monocrystalline wafers, the SOL9620 Series demonstrated an 80% reduction in contact resistance; approximately a 3mV increase in Voc; and up to 0.25% absolute efficiency gains. The unique chemistry of SOL9620 Series also enable the ability to be fired through different combination of passivation layers and at a relative lower peak temperature than standard firing temperatures. This is ideal for PERC applications.

The SOL9621 Series has demonstrated great results for regular emitter and LDE applications. When tested against Heraeus' SOL9610 Series on 85 Ω /sq. multicrystalline wafers, customers experienced higher electrical performance: a 50% reduction in contact resistance; a 1 – 2 mV increase in Voc; and greater than 0.10% absolute efficiency gains. The SOL9621 Series provides customers with a flexible and robust process window, which aids in providing a lower manufacturing cost. SOL9621 is also highly recommended for the 1st and 2nd layer of double printing applications with customers confirmed efficiency gain greater than 0.10% over the best commercially available double printing pastes.

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To learn more about Heraeus' products and services for the photovoltaic industry, visit us at this year's Intersolar North America at the Moscone Center West Hall on level 1 in booth 7611. You can also go to www.pvsilverpaste.com for more information.

About the Heraeus Photovoltaics Business Unit

The Heraeus Photovoltaics Business Unit is an industry leading developer and manufacturer of silver metallization pastes for the photovoltaic industry. For over 40 years, Heraeus has built a reputation of innovation, extensive research and new product development in thick film technologies for some of the most prominent companies within a variety of industries. In the field of photovoltaics, the Heraeus Photovoltaics Business Unit applies this history and its innovative technology to offer metallization pastes for solar cell applications. The Heraeus SOL Series of silver pastes is specially formulated to provide higher efficiencies and wider processing windows, resulting in better yields and higher output for cell manufacturers.

The Hanau-based precious metal and technology group Heraeus is a globally active family-run enterprise with a history of more than 160 years. We provide high-end solutions to our customers to lastingly strengthen their competitive position. Our areas of competence include precious metals, materials and technologies, sensors, biomaterials and medical devices, quartz glass and specialty light sources. In the financial year 2013, Heraeus achieved a revenue from the sale of products of €3.6 bn, while the revenue from precious metal trading was €13.5 bn. With about 12,500 employees in more than 110 companies world-wide, Heraeus is in a leading position on its global sales markets.

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