there are important telecommunications frequencies. Transparent conducting oxides have dielectric constants that are tunable through doping, which makes them interesting alternatives to metals," commented Brongersma.

Another recent development was a hyperbolic metamaterial multilayered stack of zinc oxide and aluminium-doped zinc oxide, which was shown to be a good candidate for developing quantum optics devices in the near-infrared region by engineering the photonic density of states.

Semiconductors also exhibit useful plasmonic and phonon–polaritonic effects for realizing interesting thermal and metamaterial devices in the mid-infrared region, with silicon carbide showing particular potential.

"Silicon carbide can support a different type of surface wave — a surface phonon–polariton — at frequencies near the transverse optical phonon resonance," explained Brongersma, who recently achieved control over the thermal radiation from individual silicon carbide subwavelength infrared resonant antennas and also suggested new types of metamaterials based on electric and magnetic Mie resonances of silicon carbide particles.

"It can be anticipated that semiconductors and intermetallics will replace metals as low-loss, tunable CMOS-compatible materials that could enable full-scale development of plasmonic and metamaterial devices," said Boltasseva.

For Brongersma, the most exciting option may be to integrate metallic and semiconductor nanostructures into new devices that capitalize on the best properties of metals (light concentration and high electrical conductivity) and semiconductors (light emission and photocurrent generation).

"I envision new types of photodetectors, modulators and optical sources benefitting from low-loss plasmonic structures that can perform simultaneous electronic and optical functions," said Brongersma.

It will be interesting to see whether semiconductors will prevail as a promising material for next-generation plasmonic and metamaterial devices or whether they will be reserved for very limited applications.

Comprising around 280 oral and poster presentations, NANOMETA 2011 brought together over 250 attendees from 30 countries to present recent research progresses and share upcoming research directions in transformation optics, metamaterials, plasmonics, near-field optics, optical super-resolution and nanobiophotonics. ❐

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Correction

In the Research Highlights for the February issue (*Nature Photon.* **5,** 68–69; 2011), the image for 'Stable and tunable' should have been for 'In the frequency domain'.

In the News & Views 'Optical black-hole analogues' (*Nature Photon.* **5,** 76–78; 2011), the name of physicist Francesco Belgiorno was misspelt as 'Franco'.

Both errors have been corrected in the HTML and PDF versions.