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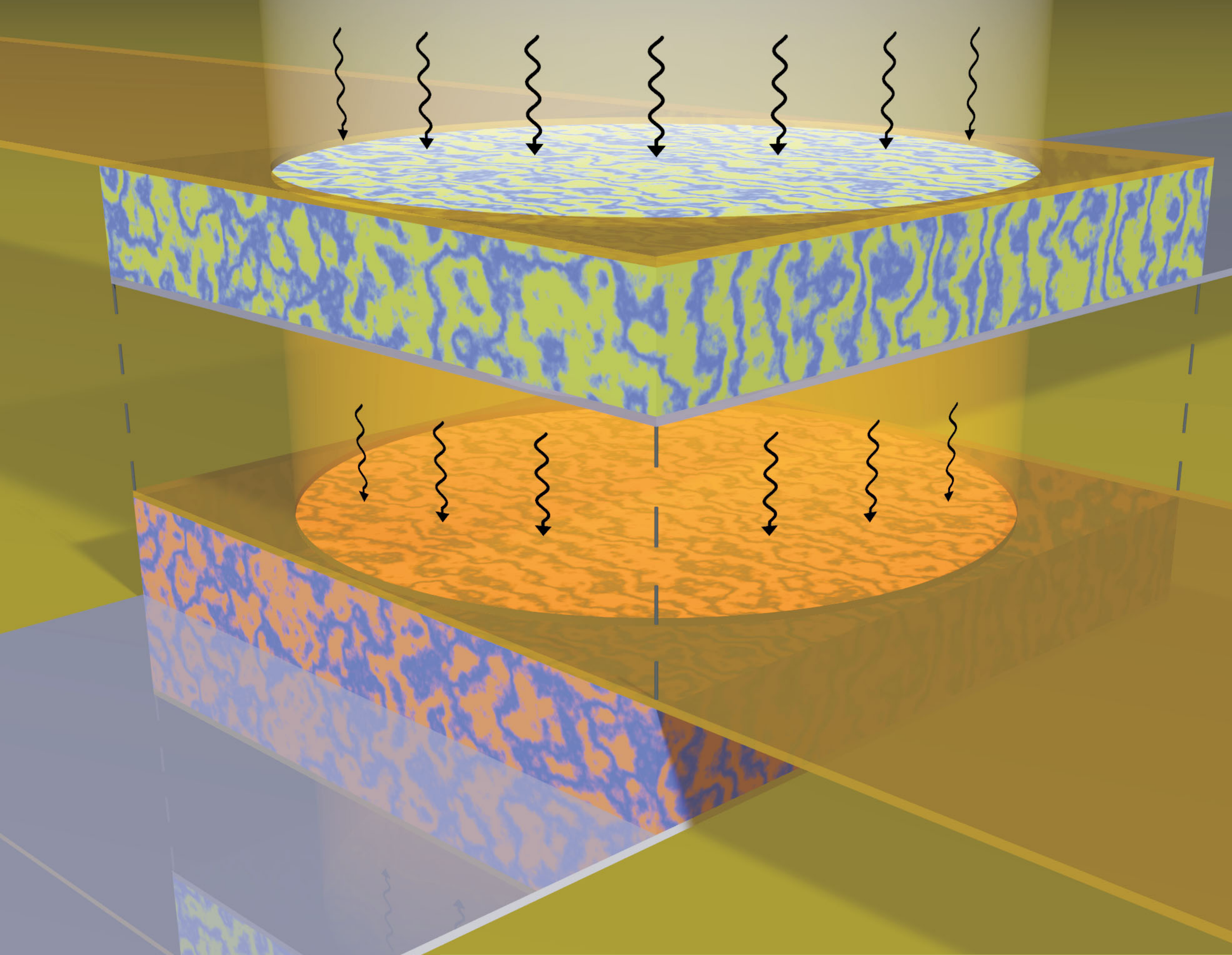
ADVANCED FUNCTIONAL MATERIALS

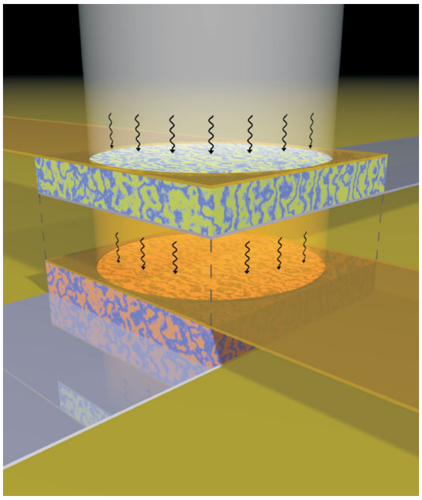


Solution-Processed Organic Tandem Solar Cells

Laser Emission from a Liquid-Crystal Photonic Device

pH-Responsive Gating Membrane Systems

Enhanced Channel Interconnectivity in Pentacene TFTs



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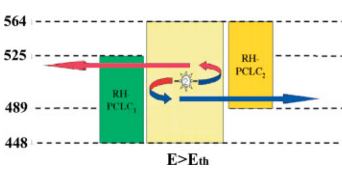
Cover:

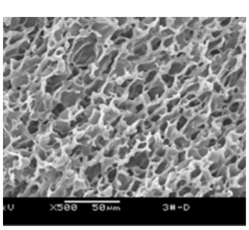
The fabrication of a solution-processed polymer tandem cell by stacking two single cells in series is reported by de Boer and co-workers on p. 1897. The bottom and top cell are complementary with respect to their absorption spectra and the layer thickness of the bottom cell was optimized in order to create an optical cavity that efficiently transmits the required wavelength for the top cell. The combination of this tandem architecture with more efficient small-bandgap materials will enable the realization of highly efficient organic solar cells.

Photonic Devices



A liquid-crystal (LC) device structure that consists of a nematic LC sandwiched between two polymer cholesteric LCs is fabricated by Takezoe and co-workers, as described on p. 1793. Electrotunable non-reciprocal light transmittance and unidirectional circularly polarized lasing emission are successfully demonstrated by the reorientation of the NLC under an applied voltage.

Membranes



A composite membrane system for pH-responsive controlled release is reported by Chu and co-workers on p. 1865. The pH-responsive polymeric gating membranes act as valves and surround a reservoir of crosslinked hydrogel, which acts as a pumping element. This system goes beyond the limits of concentration-driven diffusion due to the pumping effects of the hydrogel and may lead to "smart" controlled-release systems for drug delivery and sensors in the future.

Thin-Film Transistors

To improve the field-effect mobility of pentacene thin-film transistors, Cho and co-workers (p. 1859) controlled the deposition conditions of the pentacene layers. Voids at the interface between the pentacene film and the dielectric layer were thus filled and the interconnectivity in the thin-film channels improved. The usefulness of this approach is confirmed by atomic force microscopy.

How to contact us:

Editorial Office:
Telephone: (+49) 6201–606-531
Fax: (+49) 6201–606-500
E-mail: afm@wiley-vch.de

Reprints:
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Courier Services:
Boschstrasse 12, 69469 Weinheim, Germany

Regular Mail:
Postfach 10 11 61, 69451 Weinheim, Germany

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