



# SCIENCE DIMENSION

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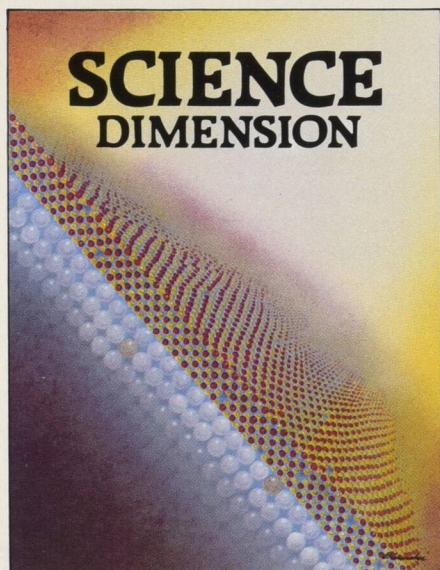
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Cover:

Solar cells that convert sunlight into electricity are just one of the benefits that derive from so-called "thin-film" technology. John Bianchi's rendering of a zinc oxide film (zinc in yellow, oxygen in red) layered on a silicon base (white) illustrates the important features of such a cell. The oxide layer is transparent to light and contains "holes" where oxygen is missing, while the silicon substrate, which gradually absorbs the light, contains a boron(gray) impurity. These "imperfections" in the two materials are intentional (it's called "doping" in the trade) and allow an electric current to flow between the layers. While the sun shines, such a device can provide electric power. (In actuality, the zinc oxide layer is far deeper than shown — up to 80 atomic layers — and very little light is absorbed by the top silicon layers.) See story page 18.

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