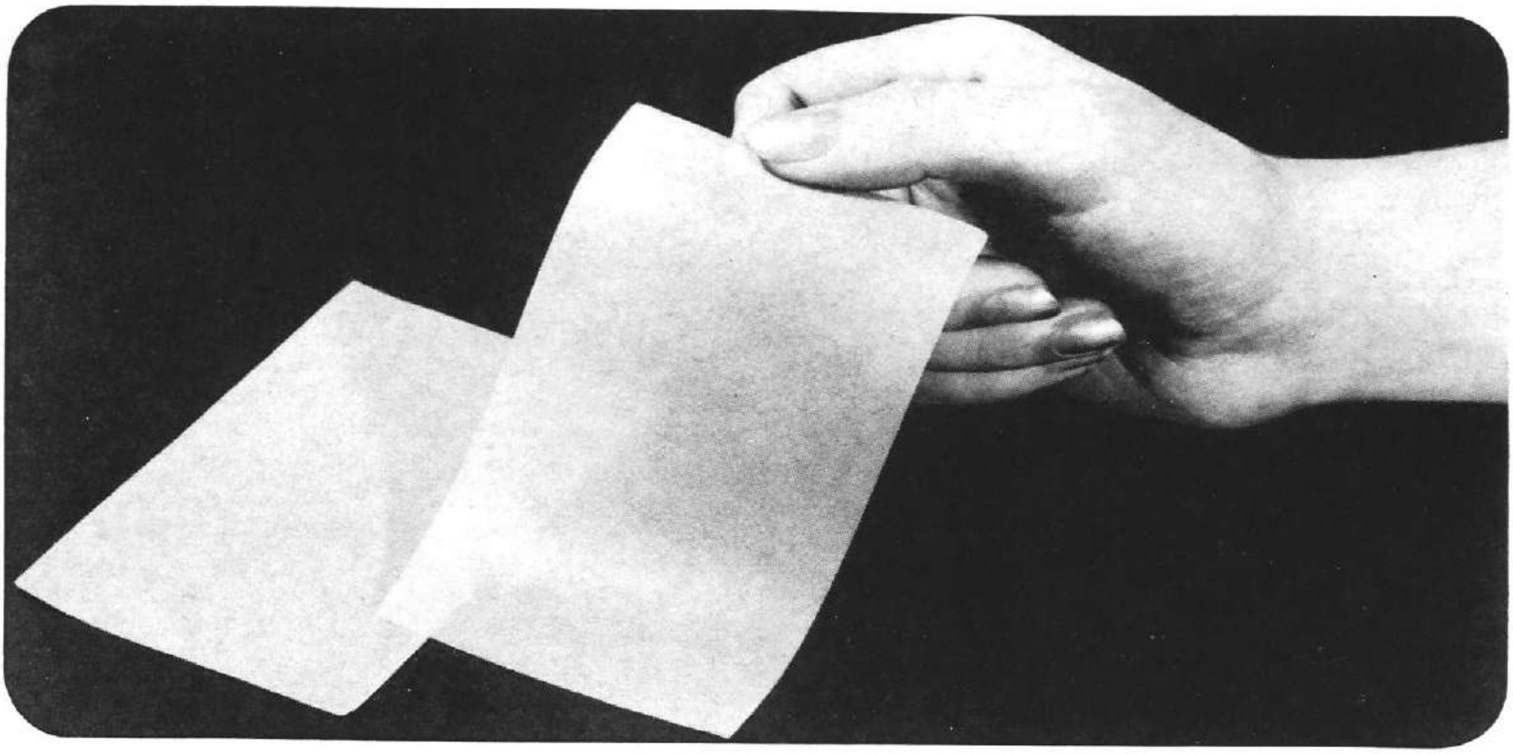
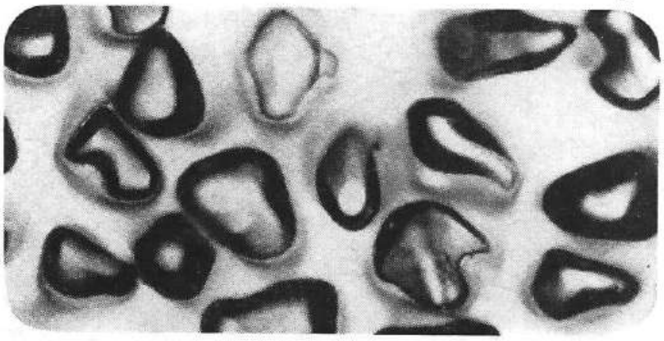


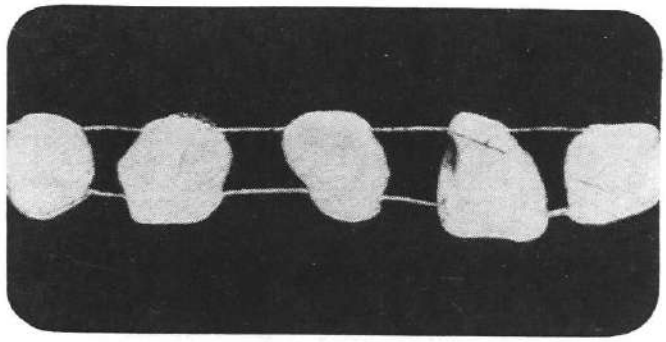
## *It looks like an ordinary sheet of plastic*

*. . . . but like this under the microscope*



←40 µm→

*. . . . and like this in cross section*



What you see is a layer of small single crystals, with diameters in the order of tens of microns, embedded in a plastic sheet with each crystal protruding on both sides.

For a number of years now, people have been trying to make such sheets. And not without reason: they combine the high quality of single crystals with the low cost of flexible thin films. Now a suitable technique has been devised by T. S. te Velde at our research laboratories in Eindhoven, the Netherlands.

Various kinds of physical and chemical treatments, such as contacting and etching, can be carried out, since the crystals are exposed at either side of the sheet. The thin lines which you see in the right-hand photograph are evaporated metal layers which sandwich the grains and connect them in parallel.

The technique for making such layers is simple enough. A thin glue layer is applied on a substrate. The powder is then sprinkled on this layer and the grains are caught on the glue like flies on a fly paper. Surplus grains are wiped off and the layer is then dipped in a plastic which fills the interspaces and leaves the grain tops exposed. After hardening, substrate and glue are removed so that the grains are accessible on both sides of the sheet. One then has an easy-to-handle, lightweight sheet in which the grains are densely packed.

Since the starting material is a powder, the method is applicable to many different materials, including substances which are difficult to prepare as large single crystals with the desired properties.

Different types of contacts can be made on each side of the sheet, e.g. ohmic contacts on one side and rectifying ones on the other. Also, since individual crystals are isolated from each other by the plastic, series connections can be obtained between parallel groups of crystals by the proper choice of deposition patterns of the contact layers.

The method was first tried out on photoconducting cadmium sulfide. And very successfully, too. We have a firm belief in the feasibility of many other applications - one of them being for flexible solar cells with a high power/weight ratio.

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