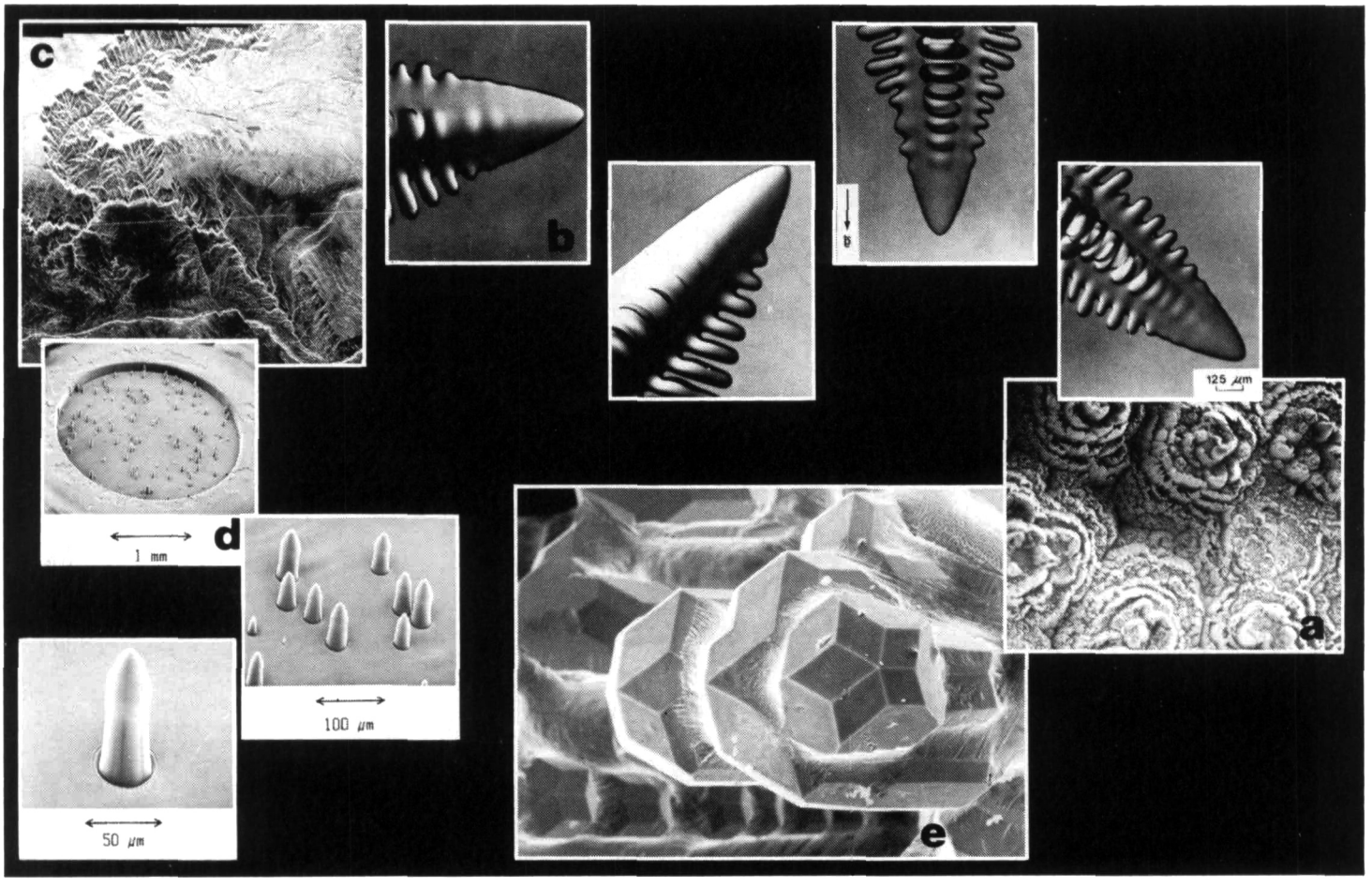
Editor's Choice



Figures appearing in the EDITOR'S CHOICE are those arising from materials research which strike the editor's fancy as being aesthetically appealing and eye-catching. No further criteria are applied and none should be assumed. When taken out of context, such figures often evoke images beyond and unrelated to the original meaning. Submissions of candidate figures are welcome and should include a complete source citation, a photocopy of the report in which it appears (or will appear), and a reproduction-quality original drawing or photograph of the figure in question.

The EDITOR'S CHOICES for this issue are five illustrations of unique patterns found in "processed materials" from disparate sources.

(a) In a split-target sputter-deposition experiment designed to form thick films of Pu-Ta alloys of varying composition with possibly amorphous and metastable phases, a region on the Pu half of the target which neighbored the Ta was found to be cross contaminated with Ta and to show the sputter-created surface morphology of a fractal-like bunch of artichokes. (H.F. Rizzo and A.W. Echeverria, *J. Less Comm. Metals* **121** [1986] p. 469; and Lawrence Livermore National Laboratory Report #UCRL-92693 [August 20, 1985]. The figure appears only in the internal report.)

(b) The classic "Christmas-tree" dendrite micrograph is always a beautiful illustration of the interplay between thermal and solute diffusion processes in crystalline solidification. These four micrographs demonstrate that gravity also impacts dendritic growth patterns through convective flows. The succinonitrile dendrites' side branches shown here are clearly affected by the orientation of growth direction with respect to gravity. (M.E. Glicksman, E. Winsa, R.C. Hahn, T.A. Lograsso, E.R. Rubenstein, and M.E. Selleck, in *Materials Processing in the Reduced Gravity Environment of Space*, ed. by R. H. Doremus and P. C. Nordine [Mater. Res. Soc. Symp. Proc. **87**, 1987], p. 39.)

(c) Although similar to preferential etchant attack patterns in many materials, the trained eye will recognize that the preferential erosion pattern shown here has a geologic scale. This radar image of the Grand Canyon was telemetered to us on August 19, 1978 by the Seasat satellite. (Photo P29948 courtesy of Caltech Jet Propulsion Laboratory through the Pasadena Gallery of Contemporary Arts.)

(d) Shown here at successively greater magnification are the morphological features left behind in a pit etched into the surface of a polyimide film by repeated (hundreds) ablative pulses of 248 nm radiation from a krypton fluoride excimer laser operated at an energy fluence of 0.25 J/cm^2/pulse. The coherence of the radiation is reflected in the etched diffraction patterns at the base of each "phallus." Surface contaminants, inclusions, and/or debris from preceding pulses are the likely cause for this irregular behavior. (SEM micrographs taken by J. Hudak, McMaster University, and contributed to the BULLETIN by J. Reid, Lumonics Corp. Details can be found in T. Znotins, D. Poulin, and J. Reid, *New Developments and Applications in Gas Lasers*, SPIE Conference Proc. #737).

(e) Normally thought only to occur metastably in rapidly solidified melts, icosahedral "quasicrystals" showing fivefold point symmetry without long-range translational periodicity have received intense study since their recent discovery. This micrograph demonstrates that an equilibrium phase can also show icosahedral point symmetry. Al_6CuLi_3 was solidified slowly, obtaining T_2 as the major phase and showing in shrinkage cavities pentagonally faceted dendrites as pictured here in a tip-end view. Nature is truly the source of the most imaginative architecture. The fully exposed five-pointed star is about 100 microns in diameter. (See F.W. Gayle, *J. Mater. Res.* **2** [1987] p. 1.)

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