

Optical Microscopy category

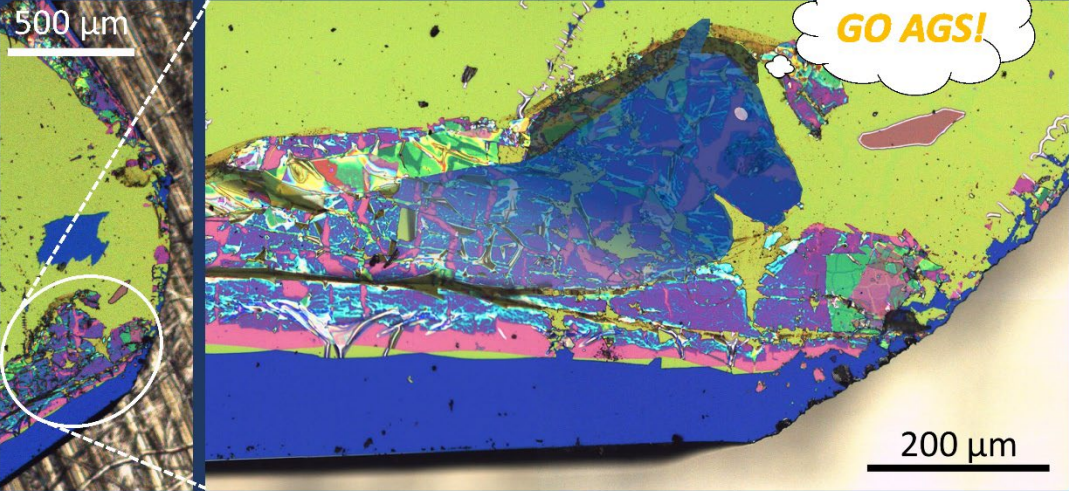
First place: “Strontium Titanate Mustang”

by Hudson Shih, Yayoi Takamura, Seung Sae Hong; University of California, Davis

Strontium Titanate Mustang

Hudson Shih, Yayoi Takamura, Seung Sae Hong
Department of Materials Science and Engineering
University of California, Davis

UC DAVIS
MATERIALS SCIENCE
AND ENGINEERING



500 μm

GO AGS!

200 μm

Single-crystalline fragments of a 42 nm SrTiO_3 film on a silicon wafer. Etching the water-soluble $\text{Sr}_3\text{Al}_2\text{O}_6$ within epitaxially-grown $\text{SrTiO}_3/\text{Sr}_3\text{Al}_2\text{O}_6/\text{SrTiO}_3$ heterostructures allows the top SrTiO_3 layer to be released from the SrTiO_3 substrate and transferred to an arbitrary surface^[1]. Near the edges, the film can fold underneath itself, resulting in multilayer stacks of SrTiO_3 fragments. Here, the fragments resemble Gunrock, the beloved mustang mascot of UC Davis.

[1] Lu, D.; Baek, D. J.; Hong, S. S.; Kourkoutis, L. F.; Hikita, Y.; Hwang, H. Y. Synthesis of Freestanding Single-Crystal Perovskite Films and Heterostructures by Etching of Sacrificial Water-Soluble Layers. *Nat. Mater.* 2016,15, 1255–1260

Optical Microscopy




Hudson Shih

Second place: “Polycrystal SrTiO₃ Galaxy”

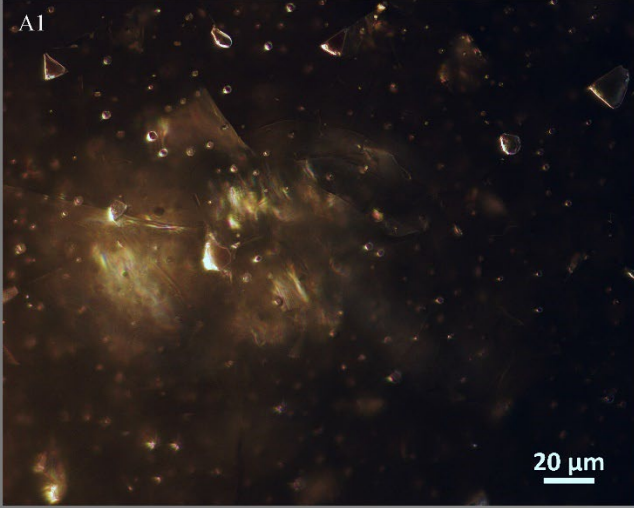
By Chukwudalu Okafor, Jürgen Rödel, Xufei Fang; Technical University of Darmstadt, Germany

Polycrystal SrTiO₃ Galaxy
Chukwudalu Okafor, Jürgen Rödel, Xufei Fang
Technical University of Darmstadt, 64287, Darmstadt, Germany




TECHNISCHE
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DARMSTADT

Impression on the surface of a polycrystalline strontium titanate sample deformed using a Brinell ball indenter (2.5 mm diameter and 1.5 kg) for up to 10 cycles (A1). Image captured using an optical microscope in the darkfield mode.



A1



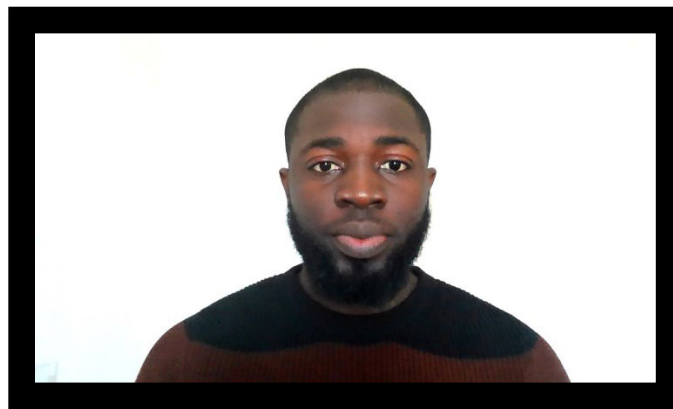
A2

source: pixlr.com

The bright contrasts (A1) feature the microcracks induced during Brinell ball indentation & pre-existing surface pores, vividly resembling a cluster of stars in the galaxy at night (A2).

20 μm

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Chukwudalu Okafor

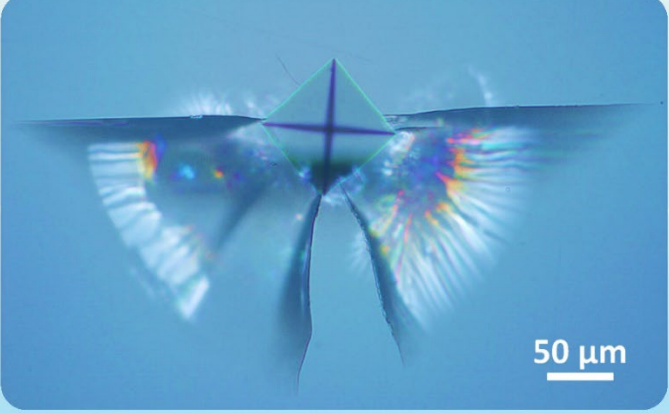
Third place: “Great White Heron ‘spotted’ on CaF₂”
by Alexander Frisch, Jürgen Rödel, and Xufei Fang; Technical University of Darmstadt, Germany

Great White Heron „spotted“ on CaF₂


Alexander Frisch, Jürgen Rödel and Xufei Fang

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Optical image of a 1 kgf Vickers indent on a well-polished single-crystal CaF₂ (111) surface made at room temperature. This image was taken using the Circular Differential Interference Contrast (C-DIC) mode of an optical microscope.



50 μm



The residual impression of the Vickers indenter together with the radial and lateral cracking systems of this CaF₂ surface vividly resemble a flying Great White Heron.

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Alexander Frisch