

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

TOPOLOGICAL CRYSTALS SATOSHI TANDA¹, Dept. of Applied Physics, Hokkaido Univ. — We report the discovery of Mobius, Figure-8, Hopf-link Crystals in NbSe₃[1,2]. We reveal their formation mechanisms of which two crucial components are the spherical selenium (Se) droplet, which a NbSe₃ fiber wraps around due to surface tension, and the monoclinic (P2(1)/m) crystal symmetry inherent in NbSe₃, which induces a twist in the strip when bent. Our crystals provide a non-fictitious topological Mobius world governed by a non-trivial real-space topology. We classified these topological crystals as an bridge between condensed matter physics and mathematics using concept of embedding. Moreover, we have investigated physical properties on the loop CDW systems. We discovered results by measurement of topological Aharonov-Bohm interference effect of CDW, Shapiro steps utilizing high-frequency resistance, , and synchrotron X-ray diffraction. We will introduce a new perspective from these results of topological crystals studies[3,4,5].

[1] S. Tanda,et.al., Nature 417, 397 (2002).

[2] T. Matsuura, et.al., PRB 73, 165118 (2006).

[3] J. Ishioka, et.al., PRL 105, 176401 (2010)

[4] Aharonov-Bohm effect in charge-density wave, M. Tsubota, K. Inagaki, T. Matsuura and S. Tanda, Europhys. Lett. 97, 57011 (2012)

[5] K. Inagaki, et.al., PRB 93, 075423 (2016)

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Date submitted: 11 Nov 2016

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