

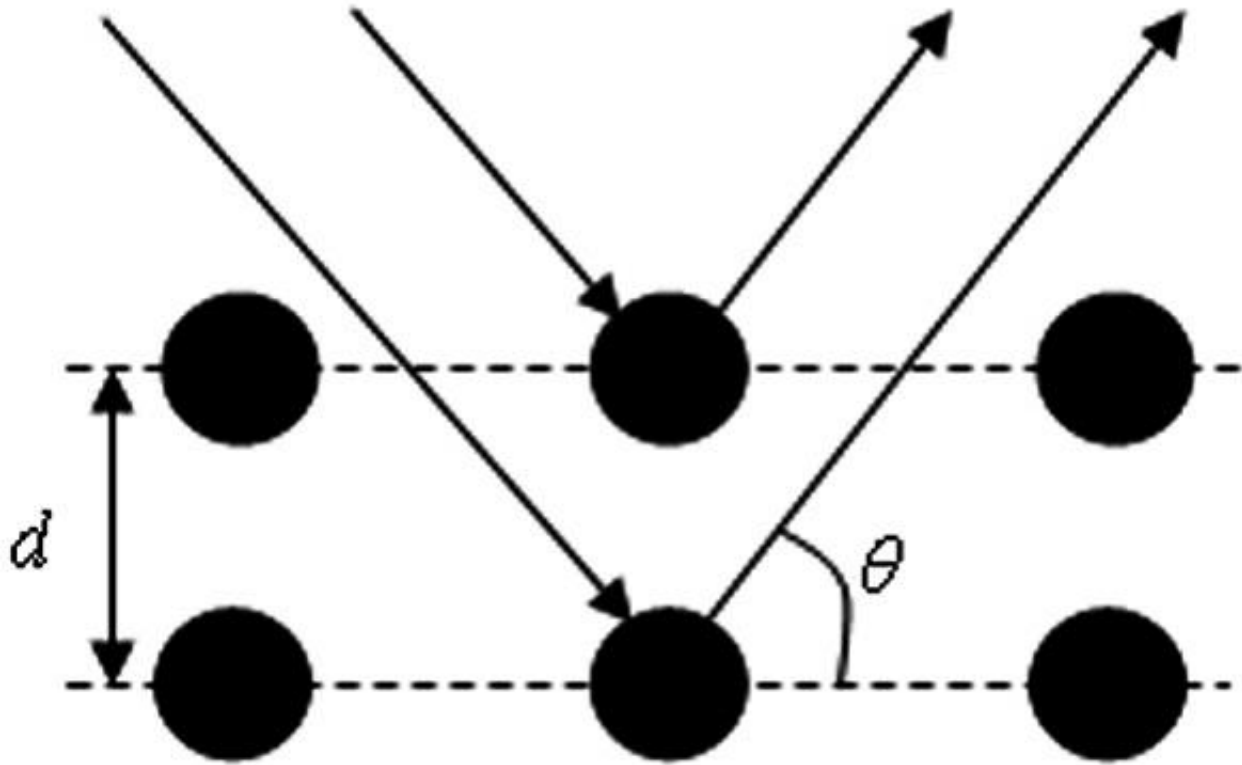
Author : nanomat



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(a)



(b)



(c)

( )  
( )

( )

$$\left( \frac{2\pi}{d} \sin \theta \right) = \frac{2\pi m \lambda}{d}$$

$$\dots) \quad \lambda = \frac{d \sin \theta}{m}, \quad (m=1,2,3)$$

1.54 neff

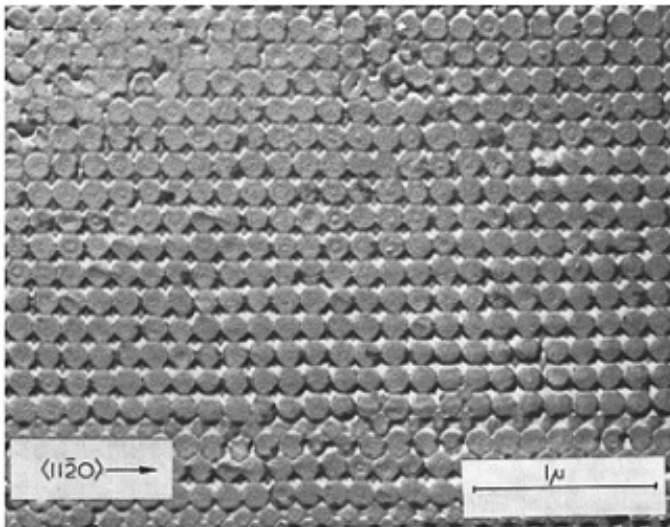
130.6nm=d

160nm=D

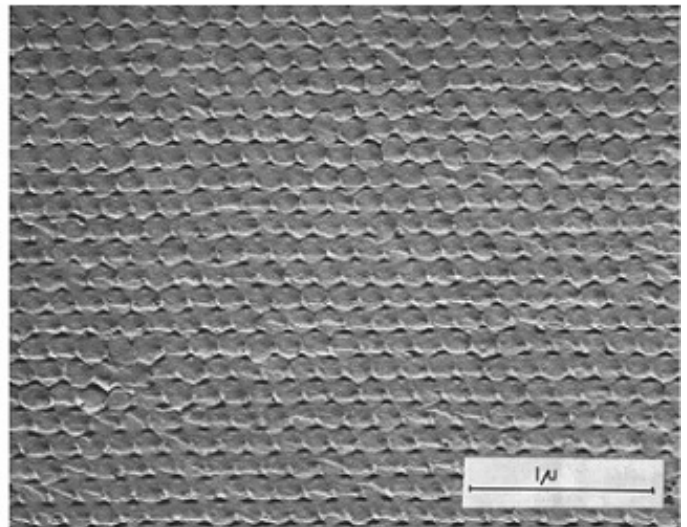
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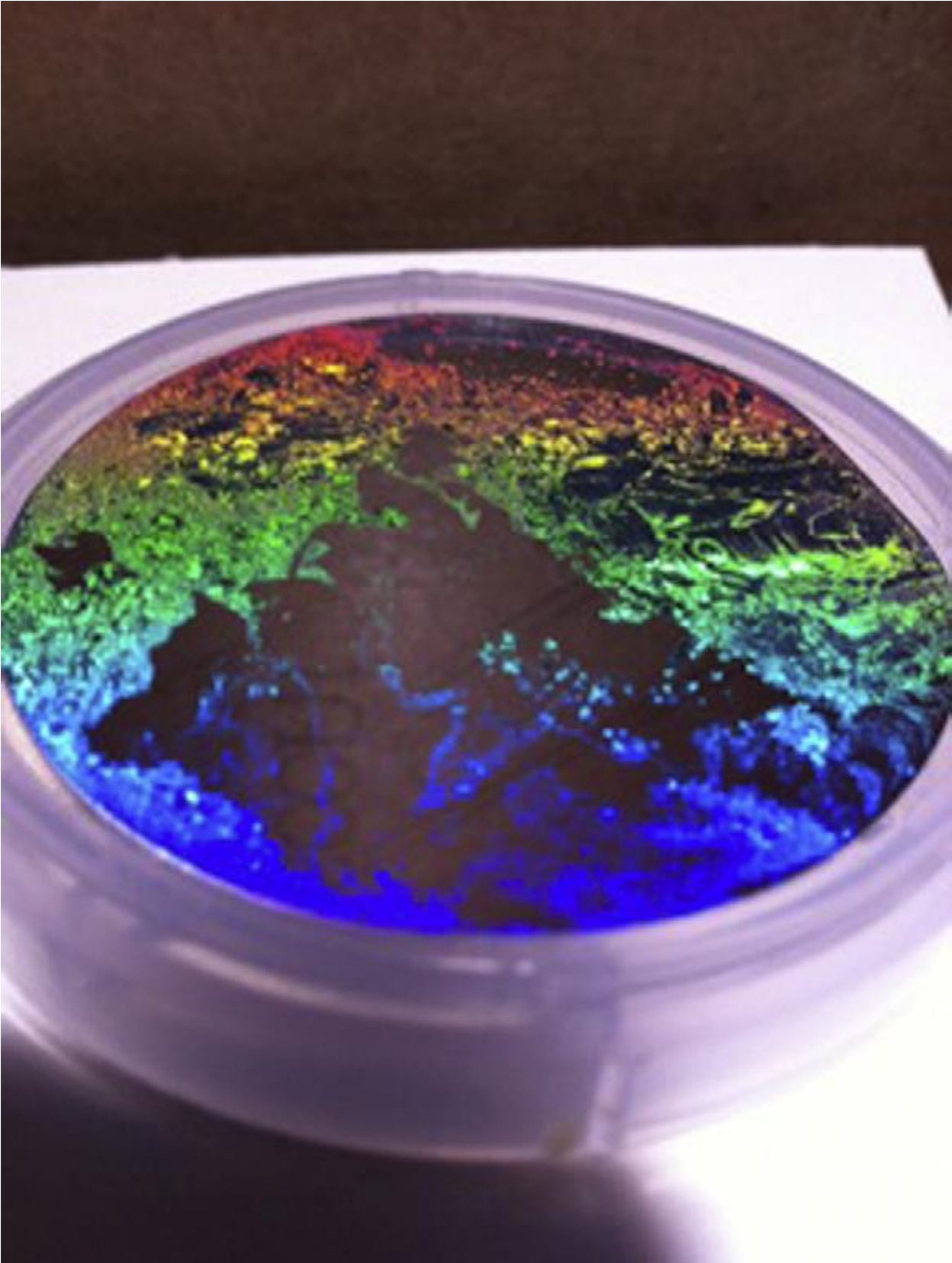
(a)



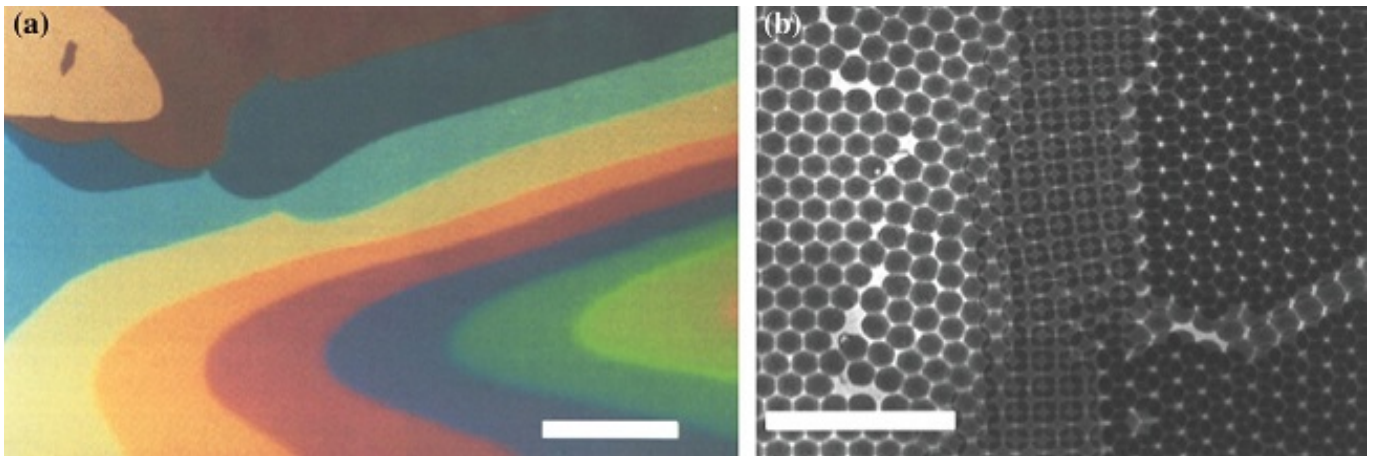
(b)

(b)

(a)



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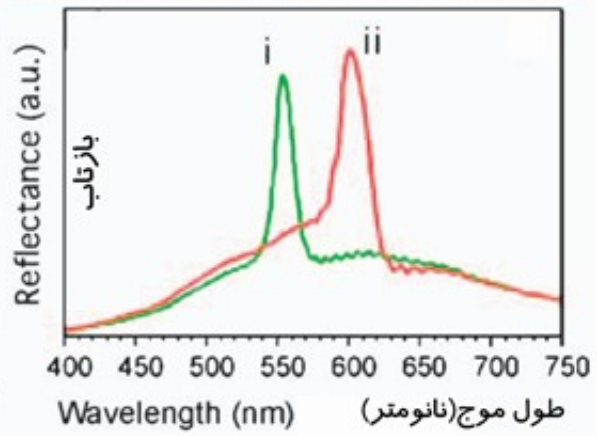
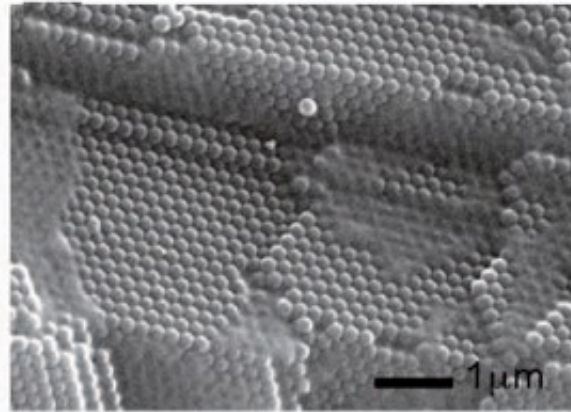
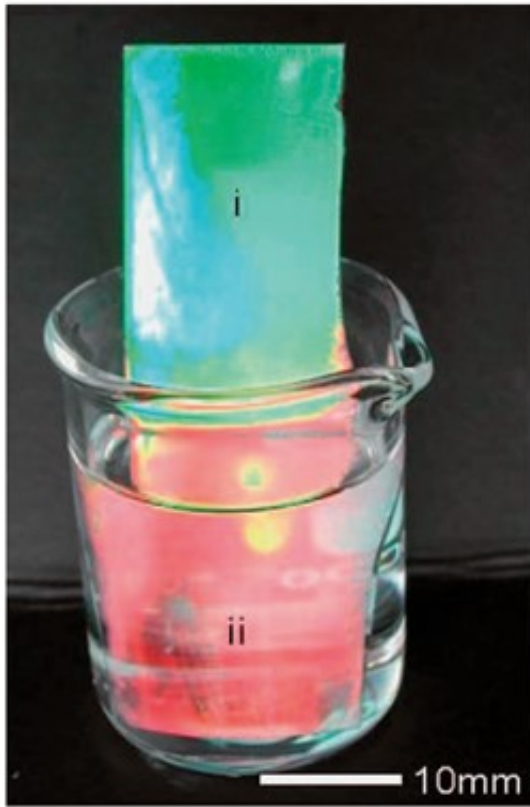
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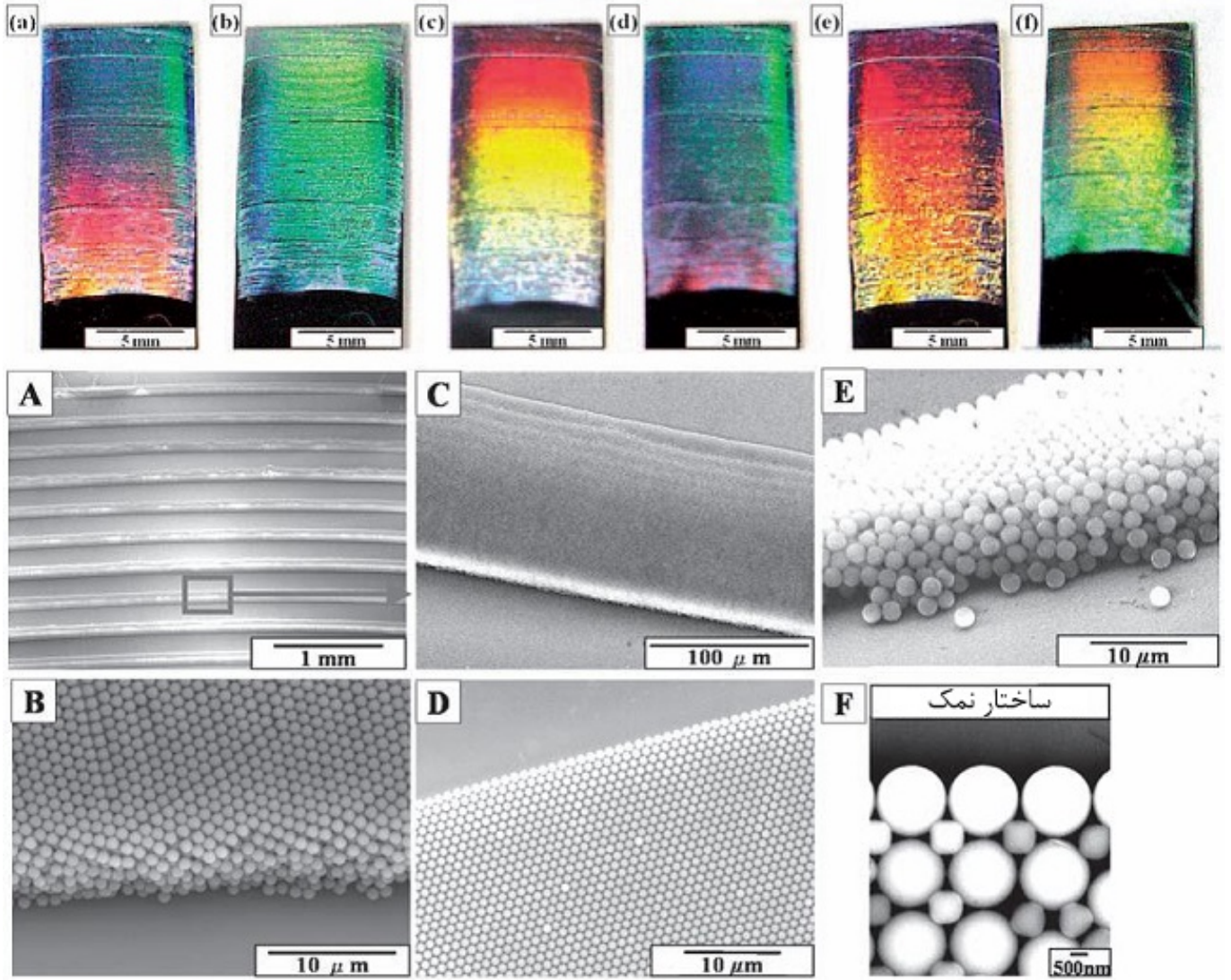
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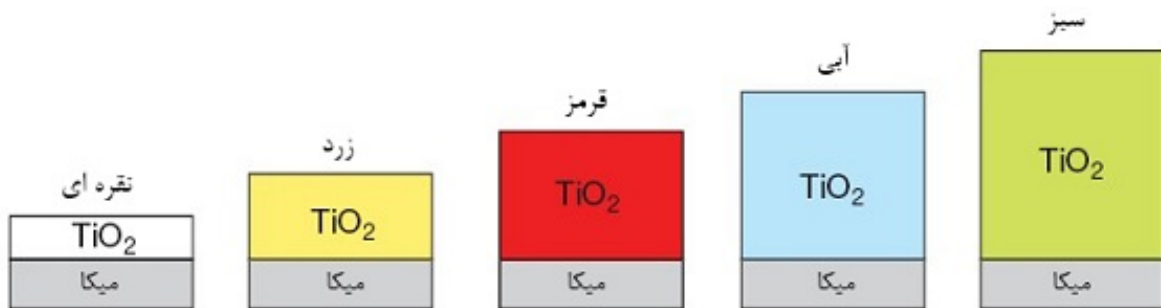
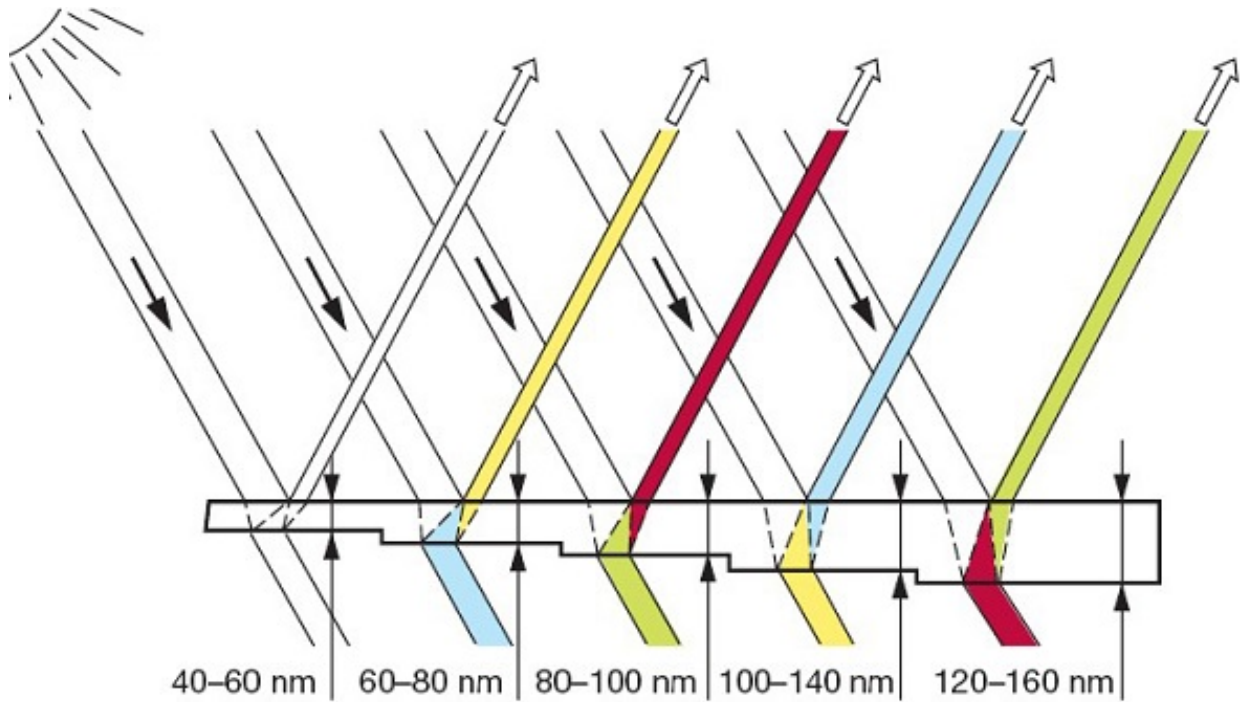
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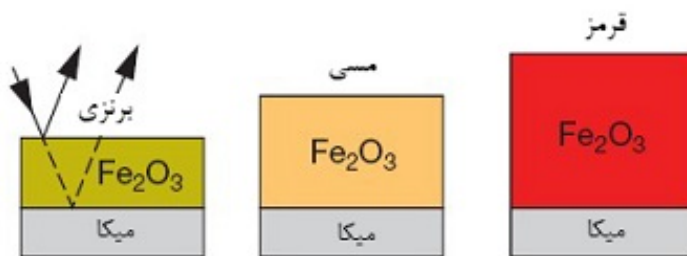
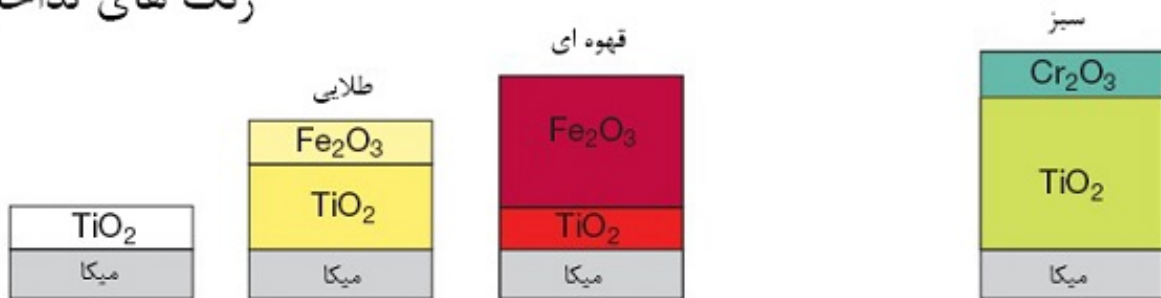
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- J. m. Benyus, Innovation inspired by nature Biomimicry, J. ECOS, No 129, 2006.
- A. Lakhtakia, R. J. Martin-Palma, Engineered Biomimicry, Elsevier, 2013, p291
- L. Jiang, L. Feng, Bioinspired Intelligent Nanostructured Interfacial Materials, 2010.
- NatureTech Technology, video, part 1&2&3.
- H. Yahya, Biomimetics, technology imitates Nature, Global Publishing, 1999.
- D. Lee, Nature ' s palette: the science of plant colors, University of Chicago Press, Chicago, IL, USA (2007).
- W.D. Bancroft, The colors of colloids. VII, J Phys Chem 23 (1919), 365–
- H. Ghiradella, Light and color on the wing: structural colors in butterflies and moths, Appl Opt 30 (1991), 3492–

- . K. Kumazawa and H. Tabata, Time-resolved fluorescence studies of the wings of *Morpho sulkowskyi* and *Papilio xuthus* butterflies, *Zool Sci* 13 (1996), 843– .
- . A.L. Ingram and A.R. Parker, A review of the diversity and evolution of photonic structures in butterflies, incorporating the work of John Huxley (The Natural History Museum, London, from 1961 to 1990), *Phil Trans R Soc Lond B* 363 (2008), 2465– .