Chapter 26
Miscellaneous Applications of Graphene

Contents

A very limited number of applications for graphene and its derivatives have been studied that do not fall into the categories of the prior chapters and so are listed briefly in this chapter.

Anti-corrosion coatings for Cu based on Si-doped graphene have been studied recently [841]. The advantages over established, commercialized anti-corrosion coatings for metals and other materials have however not been clear from these studies.

A "molecular switch" was very recently (2016) reported, in which a diarylethene molecule was tethered to two graphene electrodes [785, 842]. In this switch's "open" state, when there is no direct bond between the diarylethene's thiophene units, the molecule acts as an insulator. However, shining ultraviolet light on it causes a bond to form between the two thiophenes, rendering the molecule an electrical conductor. Visible light breaks the bond and returns the molecule to its insulating state. It would however appear, in this author's humble opinion, that the claim that this "molecular switch" could be a "key component for ever-shrinking electronic devices" [785] is still quite far from realization.

26.1 Problems and Exercises

1. Describe applications of graphene in anti-corrosion coatings. Review the reference cited in this chapter for this. How does this compete with established commercial anti-corrosion coatings?
2. Describe applications of graphene as a "molecular switch." In your estimation, what are the hurdles or technical milestones that would have to be crossed before such applications would actually be incorporated into electronic devices?

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