

2 D materials nanotechnologies between great expectations and lost illusions

Mircea Dragoman

*National Research and Development Institute in Microtechnology,
Str. Erou Iancu Nicolae 126A, 077190 Bucharest, Romania*

This talk will be a review of the state of the art of 2D materials starting with graphene. The graphene discovery and latter of other 2D materials have produced a revolution in nanotechnology. New physical phenomena were predicted, unprecedented physical parameters such huge mobilities, extreme large Young modulus and other formidable properties have flooded the leading scientific journals with thousands of scientific papers. The new era of great expectations started and it was believed that in few years, for example, the graphene FETs will replace Si FETs in computers and other leading applications. Today, some groups are in the phase of lost illusions. Why? The main reason was a race to fabricate the electronic devices based on 2D materials with a similar architecture used for many years for semiconducting devices. In many ways, this approach was false because the graphene and other 2D materials physics is totally different compared to that of semiconductors. Therefore, the most important progress in 2D material applications is based on devices which benefit the specific physics of 2D materials. There are still great expectations and many examples will be provided, but this requires new ways to understand nanotechnologies and their physics as well as the design of 2D materials components and circuits and their fabrication.

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