Eight favorite papers of Humberto Terrones and why

   **DOI**: 10.1038/352762a0

   In this paper the concept of Negative Gaussian curvature was introduced theoretically to produce periodic sp² curved crystals. These structures were named Schwarzites after Hermann Amandus Schwarz also are called Mackay-Terrones crystals.


   In this paper using differential geometry, different sp² carbon nanostructures are studied using changes in Gaussian curvature, Positive Gaussian curvature for Fullerenes, Negative Gaussian curvature for Schwarzites and zero Gaussian curvature for graphene. The curvature is introduced through “topological defects” such as pentagons. Heptagons, octagons, etc.

   **DOI**: 10.1126/science.288.5469.1226

   For the first time using high resolution transmission electron microscopy the coalescence of single walled carbon nanotubes were observed. A theoretical model involving vacancies and negative Gaussian curvature is involved in the coalescence. DOI: 10.1126/science.288.5469.1226

   **DOI**: 10.1103/PhysRevLett.85.146

   In this manuscript for the first time the electronic properties for nanotubes made of transition metal dichalcogenides (TMDs) were calculated, finding direct and indirect band gaps depending on their structure (arm-chair indirect gap zigzag direct gap). These results show the first theoretical evidence of direct band gap in single layer TMD.

   **DOI**: 10.1103/PhysRevLett.84.1716
In this manuscript different 2-Dimensional crystals of graphene are studied. The crystals exhibit a balance of positive (pentagons of carbon) and negative Gaussian curvature (heptagons of carbon). The structures are named Haeckelites in honor of Ernst Haeckel because the resemblance with the radiolaria drawings.


DOI: 10.1038/nnano.2007.107

In this manuscript by using high resolution transmission electron microscopy the birth of a multiwalled and single walled carbon nanotubes is observed in-situ for the first time.


DOI: 10.1088/0034-4885/75/6/062501

In this manuscript an understandable theoretical-experimental review of defects and doping in graphenic structures is presented.


DOI: 10.1038/srep04215

In this manuscript new Raman modes are calculated theoretically and found experimentally for few layers of different transition metal dichalcogenides (MoS$_2$, WS$_2$, WSe$_2$, MoSe$_2$).