

Graphene Nano-platelets (GP7)



Applications:

Batteries
Catalyst
Advanced Composites
Optoelectronics
Super-capacitors
Water and air filters
Solar cells
Implants and medical
Touch screens
Conductive inks
Sport tools
Conductive glues and polymers

Graphene (GP7) is a one-atom-thick sheet of carbon which has unique properties, such superior mechanical strength, exceptional electronic and thermal conductivities, impermeability to gases as well as many other properties that make it highly attractive for a broad range of applications.

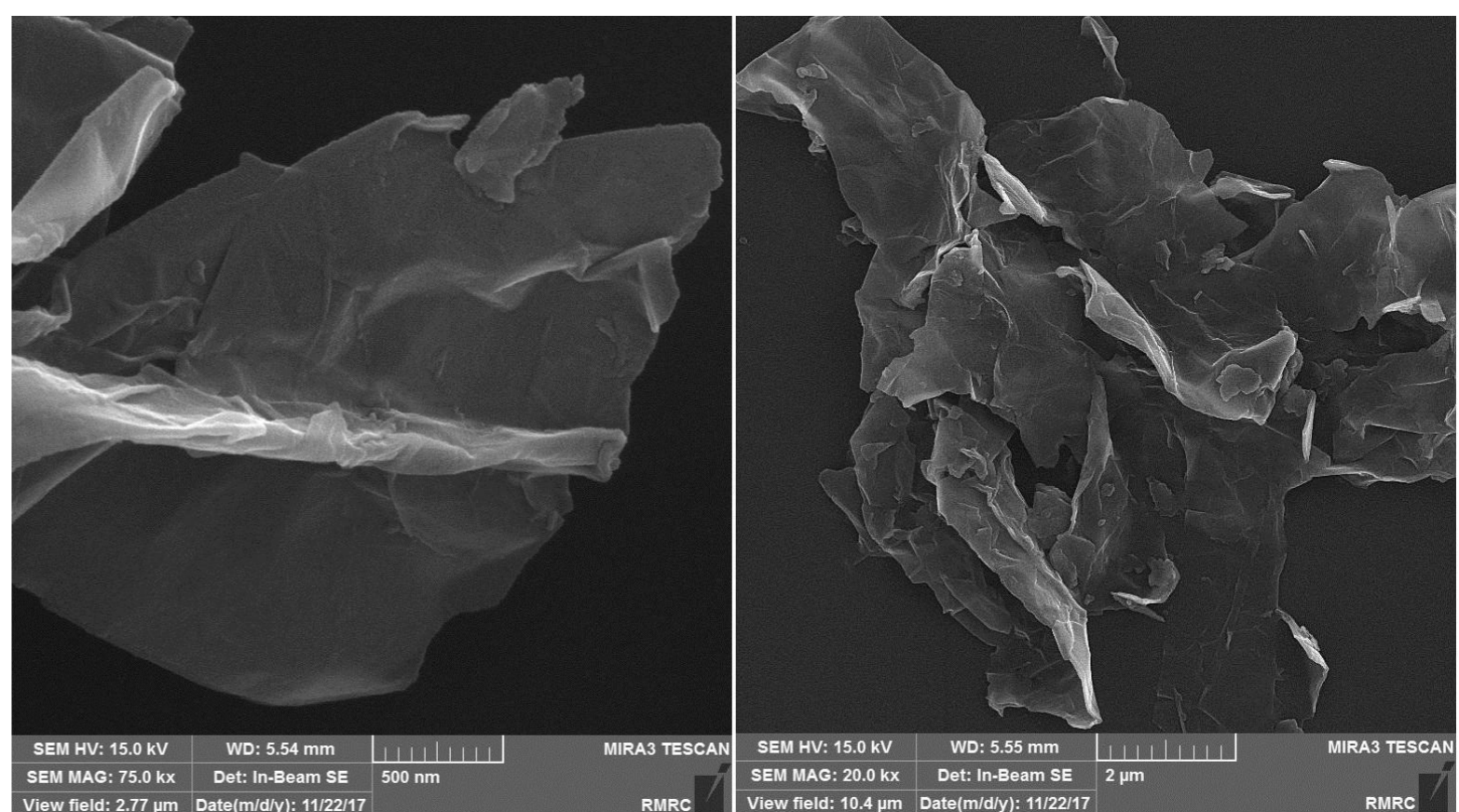
We have successfully produced graphene nanoplatelets by electrochemical exfoliation of graphite sources. The main advantageous of this product:

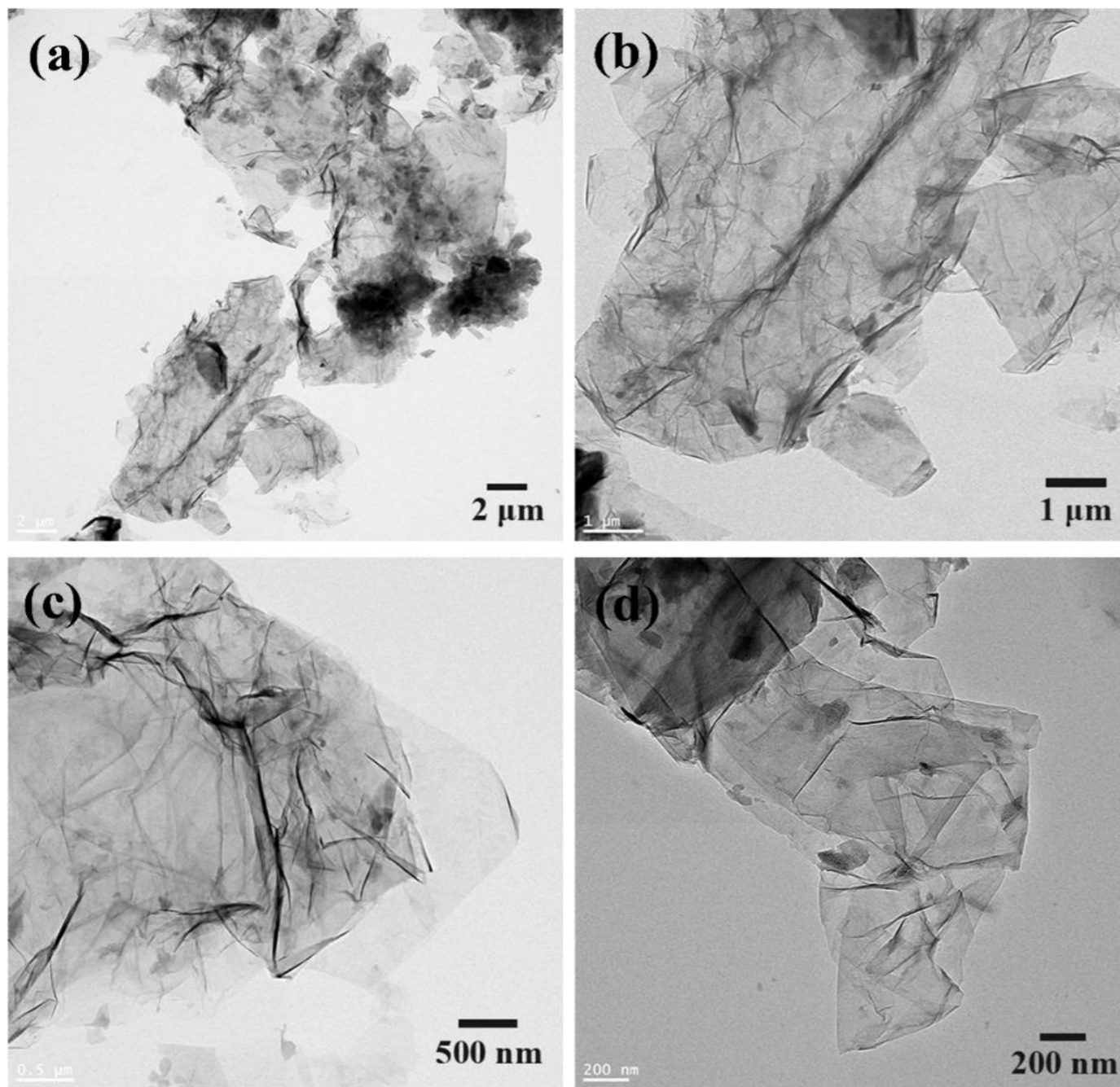
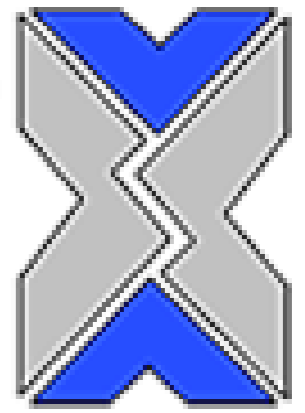
- Mass production in few times
- High quality
- Low cost

Parameter	Specifications
Appearance	black powder
Carbon content	> 99%
Relative density	0.2 g/cm ³
N° layers	Few layers



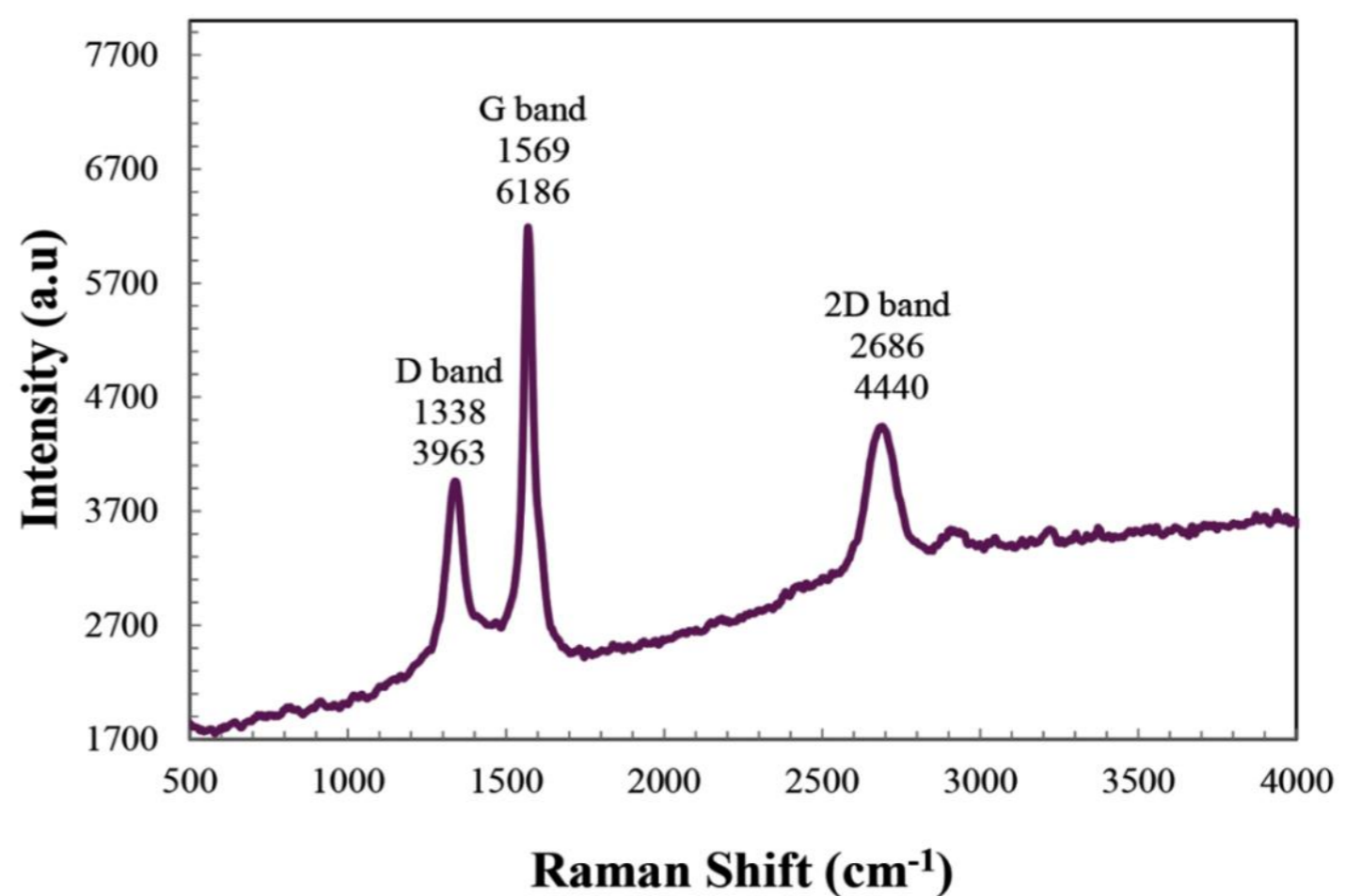
The morphologies of exfoliated graphene are shown in Figure. As it can be seen, the exfoliated graphene have high surface area that make it suitable for many applications such as filler in composite structures. In addition, the exfoliated graphene is comprised of wrinkled/ folded thin sheets. Moreover, the partial transparency of morphologies indicate the few layers of graphene.





TEM images give valuable information about the morphology and number of layer of graphene. TEM images of exfoliated graphene are shown in Figure. As it can be seen, in all images, there is a mixture of multi-layer (black area) and few layer graphene (transparent area). However, the high percentage of synthesized graphene have few layers (2-5). In addition, the TEM images at high magnifications reveal that the synthesized graphene have high transparency, demonstrating the few layers of graphene nanosheets.

Raman spectroscopy is a useful and sensitive technique for determining defects and number of layers of graphene. The Raman spectrum of synthesized graphene is illustrated in Fig. 3. Clearly, there are three peaks in the range of 1200-3000 cm^{-1} , typically at 1338 cm^{-1} , 1569 cm^{-1} and 2686 cm^{-1} . These peaks respectively correspond to the D, G and 2D bands. The presence of D peak indicates the defects in the graphene structure and Also, this peak is only for graphene, and Raman analysis of graphite does not show this peak. In addition, the G band is related to the sp^2 hybrid carbon atoms. The ratio of the I_D/I_G represents the amount of defects in the synthesized graphene. For our experiments, the I_D/I_G ratio is about 0.64, indicating the very low percentage of defects in graphene. The 2D band at 2686 cm^{-1} and the intensity ratio, $I_{2D}/I_G = 0.72$, confirmed that the electrochemically exfoliated graphite sheet had only a few layers.



The XRD pattern of graphite and synthesized graphene is illustrated in Figure. Clearly, for graphite and synthesized graphene, one peak at 26.4 is founded. However, for synthesized graphene, the intensity of mentioned peak is so lower than that for graphite powder. Decreasing the intensity reveals the reducing of layers and increasing the d-spacing of graphite powder after electrochemical method.

