

The Obstacles of Graphene industrialization

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Over the past two decades, Graphene has become an important nanomaterial in many science fields because of its exciting electrical, thermal, and mechanical properties[1-2]. During these years, a large number of methods have been proposed to prepare graphene, and these methods can be categorized into two groups, bottom-up and top-down methods. The top-down methods are based on the exfoliation of graphite, and it includes liquid-phase exfoliation with ultra-sonic[3], electrochemical method[4], oxidation-reduction method[5], and ball-milling method[6].

Unlike bottom-up method, top-down method produces graphene as a form of powder, and generally this graphene powder has been used in the industry in two types, dried powder type and solution type. However, most companies who want to use graphene powder are having difficulty applying both types into their products because of several problems.

The first problem is that graphene powder is difficult to disperse especially for the dried powder type. Because of high specific surface graphene is very hard to disperse into the solvent. The second is that the solution type which was made for solving the first problem contains very low concentration of graphene. Usually, the solution type products in the market contain 1~3% of graphene, and this concentration is too low to apply so that it makes customer's process cumbersome.

Therefore, the key for the application of graphene powder in the industrial field is how to provide highly concentrated graphene solutions. We, Everplus Inc., have recently developed the process for graphene solution with high concentration(up to 50%), and its several promising application data were obtained.

References

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Figure 1: Our graphene solution and its application data