

AUSTRALIAN SECURITIES EXCHANGE ANNOUNCEMENT

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Carbon Nanotubes Conductive Thermoplastics, Epoxies, and Coatings

Carbon in various forms is used as an additive to a range of materials to increase conductivity. It is well established that such added particles, when they have a higher aspect ratio (being the ratio of their length to their width) as is the case with carbon nanotubes, require significantly lower quantities of carbon to be added to achieve a given level of conductivity.

Carbon nanotubes are ideal in this sense, since they have the highest aspect ratio of any form of carbon fibre. In addition, their natural tendency to form networks provides inherently long conductive pathways, even at ultra-low loadings, making them ideal additives for these purposes. The two keys with this application is firstly the quality of the carbon nanotubes and secondly the evenness of dispersion of the carbon nanotubes in the particular material.

Thermoplastics

The use of carbon nanotubes in thermoplastics to reduce resistivity is an ideal application, although cost has in the past often been a concern. In response to this, Eden Energy Ltd ("Eden"), through its US subsidiary, has developed a low-cost method to produce high-quality carbon nanotubes.

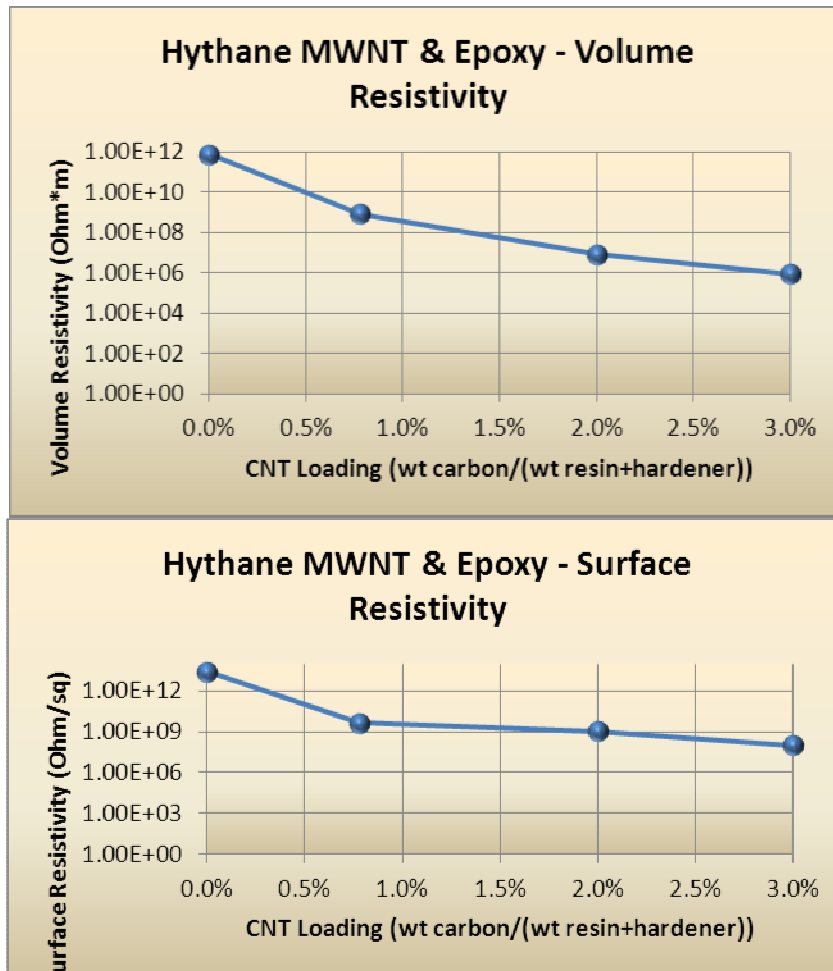
The following table shows loadings of carbon black, a lower grade form of carbon that is also currently used to increase conductivity, as compared to loadings of carbon nanotubes necessary to achieve various levels of conductivity. As can be seen, a substantially lower loading of carbon nanotubes is necessary to achieve conductivity equivalent to that of carbon black.

Ohms/Square	Carbon Black	Ohms/Square	Carbon Nanotubes
10^{14}	5%	10^7	1%
10^{12}	10%	10^6	2%
10^{10}	15%	10^5	4%
10^4	20%	10^4	6%

Lower loadings of carbon nanotubes not only provide a cost advantage, but also help maintain the original characteristics and benefits of the materials, such as strength and also weight.

Epoxies

Another common use for carbon nanotubes is as an additive for epoxy composites in applications requiring electrostatic dissipative materials. The following two graphs show carbon nanotube/epoxy composite results achieved by Eden. A conductivity improvement of 6 orders of magnitude (ie one million times) was seen with as little as 3% of carbon nanotube addition by weight. To achieve similar resistivities using carbon black, approximately 20% by weight must be added.



Conductive Thermoplastics and Epoxy Applications

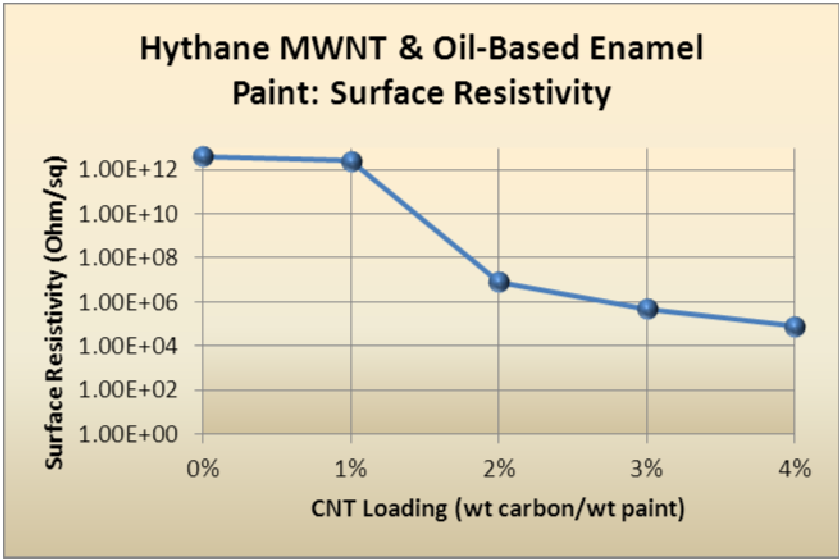
The following is a list of the typical applications that could use carbon nanotubes for improved conductivity in thermoplastics and epoxy applications:

- Electrostatic painting
- Static dissipative flooring
- Static dissipative workspaces
- Static dissipative containers & cabinets
- Static dissipative composite structures
- Shielding bags
- Electrostatic discharge tools

Conductive Paints & Coatings

Paints and coatings are also ideal candidates for the benefits of carbon nanotubes. Typically, carbon nanotube-filled coatings are used in applications requiring electrostatic dissipative materials.

The following graph shows how the addition of Eden’s carbon nanotube to oil-based enamel paint produces a very significant increase in conductivity improvement of 7 orders of magnitude (i.e. 10 million times increase) is achievable with as little as 4% CNT addition by weight.



Conductive Coatings Applications

The following is a list of the typical applications that could use carbon nanotubes for improved conductivity in paints and coatings:

- Static dissipative flooring
- Static dissipative workspaces
- Static dissipative cabinets & containers
- Anything requiring static dissipation that can be coated.

Summary

In relation to the conductive thermoplastic, epoxy and coatings applications, Eden has been able to achieve very competitive results which are targeted to translate into sales as its production process and cost effectiveness continue to improve, as has been the case over the past 12 months. Various companies in both USA and India that currently use carbon products in such applications are trialling or planning to trial Eden’s carbon products for suitability in a range of these applications and, whilst Eden has no control over the test timetables, it is in close contact with these companies.

Gregory H. Solomon
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