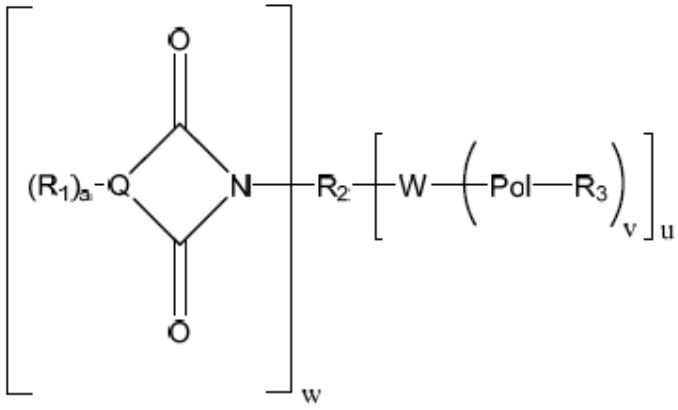
What is claimed is:

1. A composition comprising

a. a graphene platelet

b. a dispersant selected from at least one of

i. imide polymers comprising a polymer chain having at least one fused aromatic imide pendant group, wherein the polymer is represented by formula (1):



Formula (1)

wherein each variable is independently

R_1 is a substituent on Q ring in any position available for bonding to a substituent group and R_1 is independently represented by at least one electron withdrawing group;

a is 1 or 2, or 1;

W is oxygen, sulphur, –NH– , or –NG– ;

R_2 is a C_1 to C_{20}, or C_1 to C_{12}, or C_1 to C_6 hydrocarbylene group;

R_3 is H or C_{1-50} (or C_{1-20}) -optionally substituted hydrocarbyl group that bonds to a terminal oxygen atom of the polymer chain forming a terminal ether or terminal ester group and may or may not contain a group capable of polymerization such as a vinyl group, or C_{1-50} (or C_{1-20})-hydrocarbonyl group (i.e., a hydrocarbyl group containing a carbonyl group) that bonds to the oxygen atom of the polymer chain forming a terminal ester group or terminal urethane group and may or may not contain a group capable of polymerization such as a vinyl group, and the substituent is halo, ether, ester , or mixtures thereof;

Pol is a homopolymer chain of ethylene oxide or a copolymer chain of ethylene oxide, wherein the ethylene oxide constitutes 40 wt % to 99.99 wt % of the copolymer chain and where in the polymer chain is selected from the group consisting a poly(ether), poly(ester) and mixtures thereof;

u = 1 to 3;

v= 1 to 2;

w= 1 to 3

v = 2 when W = –NG– ;

v = 1 when W = Oxygen, Sulphur, or –NG– ;

G is a hydrocarbyl group containing 1 to 200, or 1 to 100, or 1 to 30 carbon atoms; and

Q is a fused aromatic ring containing 4n+2 π-electrons, wherein n = 2 or more, and Q is bonded to the imide group in such a way to form a 5 or 6 membered imide ring

ii. alkylene oxide polyurethane polymers comprising from 35% to 90% by weight of a poly (C_{2-4}-alkylene oxide) based on the total weight of the polyurethane polymer wherein not less than 60% by weight of the total poly (C_{2-4}-alkylene oxide) is poly (ethylene oxide) and wherein at least 5% poly (C_{2-4}-alkylene oxide) based on the total weight of the polyurethane

polymer is incorporated in lateral chains, which lateral chains are characterized as poly(C_{2-4}-alkylene oxide) chains with at least two groups, which react with isocyanates, which are located at the one end of the chain such that said chains are laterally disposed in relation to the polyurethane polymer backbone, wherein said polyurethane polymer has a number average molecular weight of not less than 2,000 and not greater than 50,000 g/mole and which polyurethane polymer contains from 10 to 180 milli-equivalents of acid groups for each 100 gm polyurethane when the polyurethane polymer contains from 35 to 45% by weight poly (alkylene oxide);

iii. a cationic or amphoteric copolymer containing at least one of dialkyl diallyl quaternary ammonium salt, methacrylamide alkyl quaternary ammonium salt, acrylic acid, acrylamide, and

c. at least one aqueous or polar solvent.

2. The composition of claim 1, wherein the graphene platelets is in the form of at least one of: mono-layer graphene; multi-layer graphene (2-10 layers); graphite nanoplatelets (>10 layers).

3. The composition of claim 1 or 2, wherein the graphene platelets have a carbon to oxygen molar ratio of greater than 25:1.

4. The composition of claim 1 or 2, wherein the graphene platelets have a carbon to oxygen molar ratio of less than 20:1.

5. The composition of any of claims 1 to 4, wherein the dispersant consists of the at least one imide polymer.

6. The composition of any of claims 1 to 4, wherein the dispersant consists of the at least one alkylene oxide polyurethane polymer.

7. The composition of any of claims 1 to 4, wherein the dispersant consists of the at least one cationic or amphoteric copolymer containing at least one of dialkyl diallyl quaternary ammonium salt, methacrylamide alkyl quaternary ammonium salt, acrylic acid, acrylamide.

8. A process to produce the composition of any of claims 1 to 5, comprising,

   a. blending a mixture of graphene platelets, water and at least one dispersant selected from the imide polymer, and

   b. subjecting the blend to mechanical or chemical exfoliation.

9. The process of claim 8, wherein the mechanical exfoliation comprises shear mixing.

10. The process of claim 8, wherein the mechanical exfoliation comprises ball milling.

11. The process of claim 8, wherein the mechanical exfoliation comprises ultra-sonication.

12. The process of claim 11, wherein the ultra-sonication is applied at 300 to 2000 watts (400-1800,500-1600, 600-1400,700-1200).