CLAIMS

What is claimed is:

1. A method to exfoliate a graphite grain, the method comprising:

transferring a mixture into a vessel,

wherein the mixture comprises a graphite grain and a fluid medium, and

wherein the vessel comprises an agitator and a chiller; chilling the mixture by the chiller such that the fluid medium at least partially solidifies into an ice grain; and

agitating the mixture by the agitator to induce a contact between the graphite grain and the ice grain to exfoliate the graphite grain.

2. The method of claim 1, wherein the agitator comprises a rotor.

3. The method of claim 1, wherein the agitator comprises a vibrator.

4. The method of claim 1, wherein the fluid medium comprises a first fluid.

5. The method of claim 4, wherein the first fluid comprises water.

6. The method of claim 4, wherein the fluid medium further comprises a second fluid.

7. The method of claim 6, wherein the second fluid comprises at least one of ethylene glycol, n-methyl-2-pyrrolidone, isopropyl alcohol, methyl alcohol, butyl alcohol, or ethyl alcohol.

8. The method of claim 6, wherein the second fluid comprises at least one of air, nitrogen, argon, oxygen, or carbon dioxide.

9. The method of claim 4, wherein the fluid medium further comprises a surfactant.

10. The method of claim 9, wherein the surfactant comprises at least one of a soap, an alkyl sulfate, an alkylbenzene sulfonate, a lignosulfonate, or sodium cholate.