## 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 ~~an ice grain~~ 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 2, wherein the rotor comprises a first blade.~~

~~4. The method of claim 3, wherein the rotor further comprises a second blade.~~

~~5~~3. The method of claim 1, wherein the agitator comprises a vibrator.

~~6. 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.~~

~~7. The method of claim 6, wherein the agitator comprises a rotor.~~

~~8. The method of claim 6, wherein the agitator comprises a vibrator.~~

~~9~~4. The method of claim ~~6~~ 1, wherein the fluid medium comprises a first fluid.

~~10~~5. The method of claim ~~9~~ 4, wherein the first fluid comprises water.

~~11~~6. The method of claim ~~9~~ 4, wherein the fluid medium further comprises a second fluid.

~~12~~7. The method of claim ~~11~~ 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.

~~13~~8. The method of claim ~~11~~ 6, wherein the second fluid comprises at least one of air, nitrogen, argon, oxygen, or carbon dioxide.

~~14~~9. The method of claim ~~9~~ 4, wherein the fluid medium further comprises a surfactant.

~~15~~10. The method of claim ~~14~~ 9, wherein the surfactant comprises at least one of a soap, an alkyl sulfate, an alkylbenzene sulfonate, a lignosulfonate, or sodium cholate.

~~16. An apparatus to exfoliate a graphite grain, the apparatus comprising:~~

~~a vessel to contain a mixture,~~

~~wherein the vessel comprises a chiller and an agitator,~~

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

~~wherein the chiller is configured to chill the mixture to at least partially solidify the fluid medium into an ice grain, and~~

~~wherein the agitator is configured to agitate the mixture to induce a contact between the graphite grain and the ice grain to exfoliate the graphite grain.~~

~~17. The apparatus of claim 16, wherein the fluid medium comprises a first fluid.~~

~~18. The apparatus of claim 17, wherein the first fluid comprises water.~~

~~19. The apparatus of claim 16, wherein the chiller comprises at least one of air, helium, nitrogen, neon, argon, or carbon dioxide.~~

~~20. The apparatus of claim 16, wherein the chiller comprises at least one of sodium chloride, ethylene glycol, isopropyl alcohol, methyl alcohol, butyl alcohol, or ethyl alcohol.~~