Claims

1. A transparent conducting film comprising graphene nanoribbons of uniform length and greater than about 90% purity.

2. The transparent conducting film of claim 1, comprising graphene nanoribbons of uniform length and greater than about 99% purity.

3. The transparent conducting film of claim 1, wherein the graphene nanoribbons have uniform length of about 30 µM, about 50 µM, about 100 µM, about 150 µM or about 200 µM and are of greater than about 95%, about 99%, about 99.5% or about 99.9% purity.

4. The transparent conducting film of claim 1, wherein the graphene nanoribbons are of a thickness of less than about 10 layers or less or about 5 layers or less, about 1 layer or less.

5. The transparent conducting film of claim 1, wherein the film has an optical transparency of greater than about 80%, about 85%, about 90% or about 95% in the visible spectrum.

6. The transparent conducting film of claim 1, wherein the film has sheet resistance of less than about 1000 ohms per square, less than about 100 ohms per square or less than about 50 ohms per square.

7. The transparent conducting film of claim 1, wherein the film has surface roughness of less than about 25 nm, less than about 15 nm, less than about 10 nm, less than about 5 nm or less than about 1 nm.

8. The transparent conducting film of claim 1, wherein the film is doped with nitric acid, iron chloride, gold chloride, ammonia gas or combinations thereof.

9. The transparent conducting film of claim 1, further comprising a nanowire.

10. The transparent conducting film of claim 9, where the nanowire is comprised of Au or Ag.

11. The transparent conducting film of claim 8, wherein the film encapsulates a nanowire.

12. The transparent conducting film of claim 1, further comprising single walled carbon nanotubes and/or double walled carbon nanotubes.

13. The transparent conducting film of claim 12, further comprising a nanowire.

14. A device comprising the transparent conducting film of claim 1.

15. The device of claim 14, wherein the device is a solar cell, a television, a display, a touch screen, a smart window or a smart phone.

16. A glass substrate coated with the transparent conducting film of claim 1.

17. The glass substrate of claim 16, wherein the transparent conducting film is flexible.

18. A plastic substrate coated with the transparent conducting film of claim 1.

19. The plastic substrate of claim 18, wherein the transparent conducting film is flexible.