How To Make Conductive Graphite Paint

Graphite powder can be mixed with a binder such as acrylic glaze to make a conductive paint that can be used in solar and battery projects. A commercial version of this material is known as wire glue used for no-solder electrical connections. This is a nice materials science problem because there are many variables that can be changed which affect the conductivity and ease of use of the final product. Coming up with a standard, repeatable method of measuring resistance is also required.

Materials

* Graphite powder- 6 oz $11
* <https://www.amazon.com/Generals-Powdered-Graphite-6-oz/dp/B00TCLCO7A/ref=sr_1_2?ie=UTF8&qid=1481848271&sr=8-2&keywords=graphite+powder>
* Acrylic Glazing Liquid 8oz $10
* <https://www.amazon.com/Golden-Acrylic-Glazing-Liquid-Gloss/dp/B005Z3XWH0/ref=sr_1_1?ie=UTF8&qid=1481848321&sr=8-1&keywords=acrylic+glaze+gloss>
* Mixing Container
* Coffee stirrer

Directions

1. Add 2 teaspoons of graphite powder to mixing container
2. Add a teaspoon of acrylic glaze
3. Mix thoroughly until it is completely uniform
4. Apply lid or transfer to airtight container.

Testing

Use a paintbrush or stirring stick to apply a piece of cardboard, let it dry.

Measure the resistance with an ohm meter in the 100s of ohms range. You should be able to see that the resistance increases with the length of the conductor path. Practice making a uniform paint line then measure the resistance of the line in ohms per millimeter. You may also be able to measure that a larger cross section of conductor has less resistance. Try applying the paint as a thin film on a conductor.

Variations

Polyvinylpyrrolidone (PVP) is an adhesive found in glue sticks. It can be dissolved in water to produce and mixed into the graphite paint mixture.

* <https://www.amazon.com/MakingCosmetics-PVP-4-4oz-125g/dp/B01GD6GC9C/ref=sr_1_1_a_it?ie=UTF8&qid=1483028386&sr=8-1&keywords=polyvinylpyrrolidone>