# 🔻 Braun–Stanley Layer Formation & Verification Logbook

## Overview

The Braun–Stanley Layer (BSL) is a thermally and electrically induced copper sulfide junction formed on a copper conductor using sulfur and DC bias. It enables directional current flow while preserving displacement current and capacitive field geometry. This field-preserving junction concept is based on copper sulfide's semiconducting properties when grown under electric bias.

## Required Materials

- Copper wire (solid or copper-plated) – 0.5–1.0 mm diameter  
- Power supply – Adjustable DC (3–12 V), current-limited  
- Sulfur powder – Pure (lab-grade or garden fungicide)  
- Torch or heat gun – capable of 300–600 °C  
- Heat-resistant surface – ceramic, stone, or metal tile  
- Alligator clip leads – for power connection  
- Digital multimeter – with diode & resistance modes  
- Optional: Infrared thermometer and magnifier

## Procedure

1. Clean a 5 cm copper wire segment.

2. Connect DC power supply: Positive lead to sulfurized end.

3. Set voltage to 5V and limit current to 200–300 mA.

4. Lay the wire on a heat-resistant surface.

5. Sprinkle sulfur on a 1 cm central section of the wire.

6. Gently heat with a torch (~400–500 °C) for 5–15 seconds.

7. Maintain DC current flow during heating.

8. Remove heat and allow to cool naturally.

## Testing the Braun–Stanley Layer

Use a digital multimeter in diode mode to measure resistance across the sulfide section:  
- Expect low resistance in one direction, higher in the reverse.  
- Measure I–V asymmetry using a small DC supply and observe diode-like response.

## Experimental Verification Log

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Entry | Date | Wire Type | Voltage / Current | Sulfur Method | Heat Time | Fwd R | Rev R | Notes | Temp Est. |

## Current-Induced Heating Observations

For experiments using self-heating wire (e.g. copper-plated nichrome), track:  
- Supply voltage and current used for heating  
- Duration of current flow before and during sulfur application  
- Enamel behavior: burn-off, residue, or intact  
- Temperature estimate (IR thermometer or observation)  
- Any discoloration, glow, or field effects observed  
- Surface adherence of sulfur layer post-treatment

## Public Domain Declaration

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