

1. The test Set-up

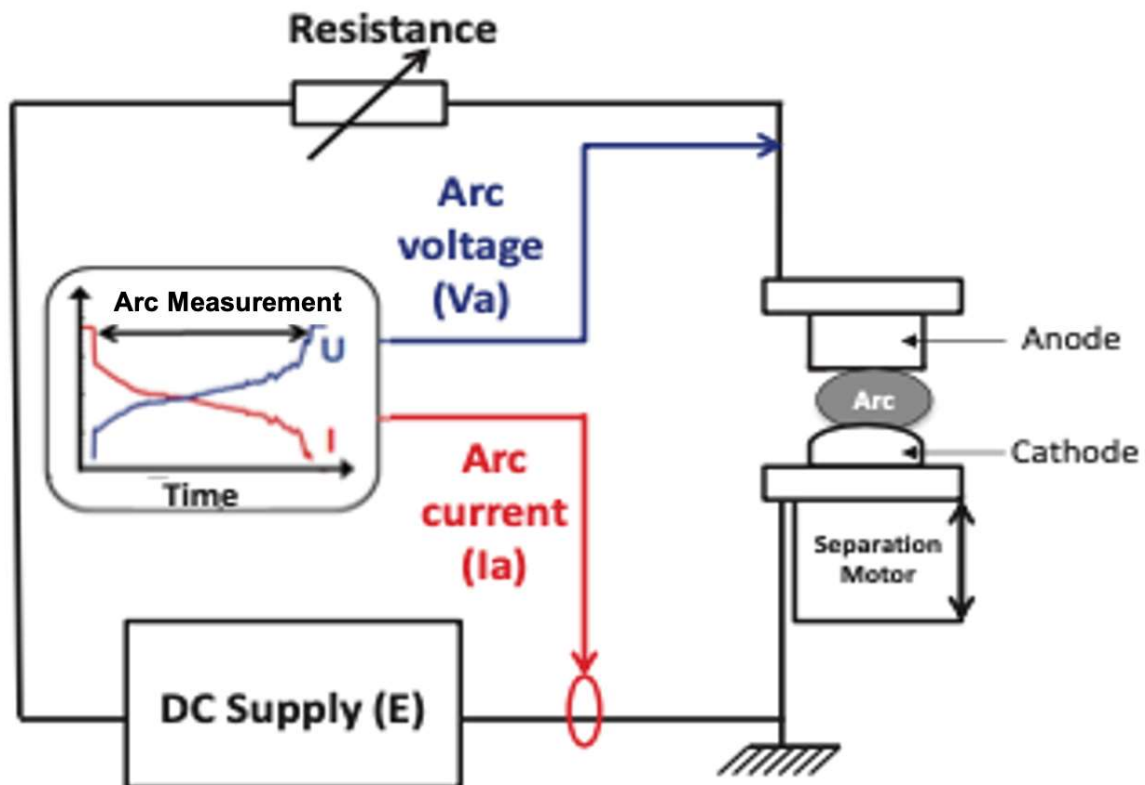


Figure 1. The experimental test bench.

The test bench is mainly composed of an electrical part (power supply 600V-10A DC, variable resistance) and a mechanical part using a stepping motor coupled (Newport MM4006) with a sliding plate, which ensures a controlled separation between the fixed and the moving contact. A digital oscilloscope, Tektronix DPO 4014b (100MHz, 2.5Gs/s) is used to sample and store the voltage and current characteristics of the arc during the break, i.e., $V(t)$ and $I(t)$. The whole system (power supply, motor and oscilloscope) is computer controlled.

This apparatus performs contact breaking under chosen voltage and current supply conditions. After breaking, electrodes are maintained at constant gap (typically from micrometers to some millimeters) during electrical measurement (some seconds).

The voltage and current measurements are performed with a sampling rate of 250KHz.

The measurements are performed with direct current and resistive loads by separating electrodes.

The data are store in `xlsx` format.

Arc_Material_gap_current_nb.xlsx (ex. Arc_Ag_1mm_4ADC_1.xlsx)

Data format in file:

Column 1: time in seconds

Column 2: arc voltage in volts

Column 3: current in amperes

1. The Arc electrical signature

Example of arc and current voltage measurement (file Arc_Ag_1mm_4ADC_1.xlsx).

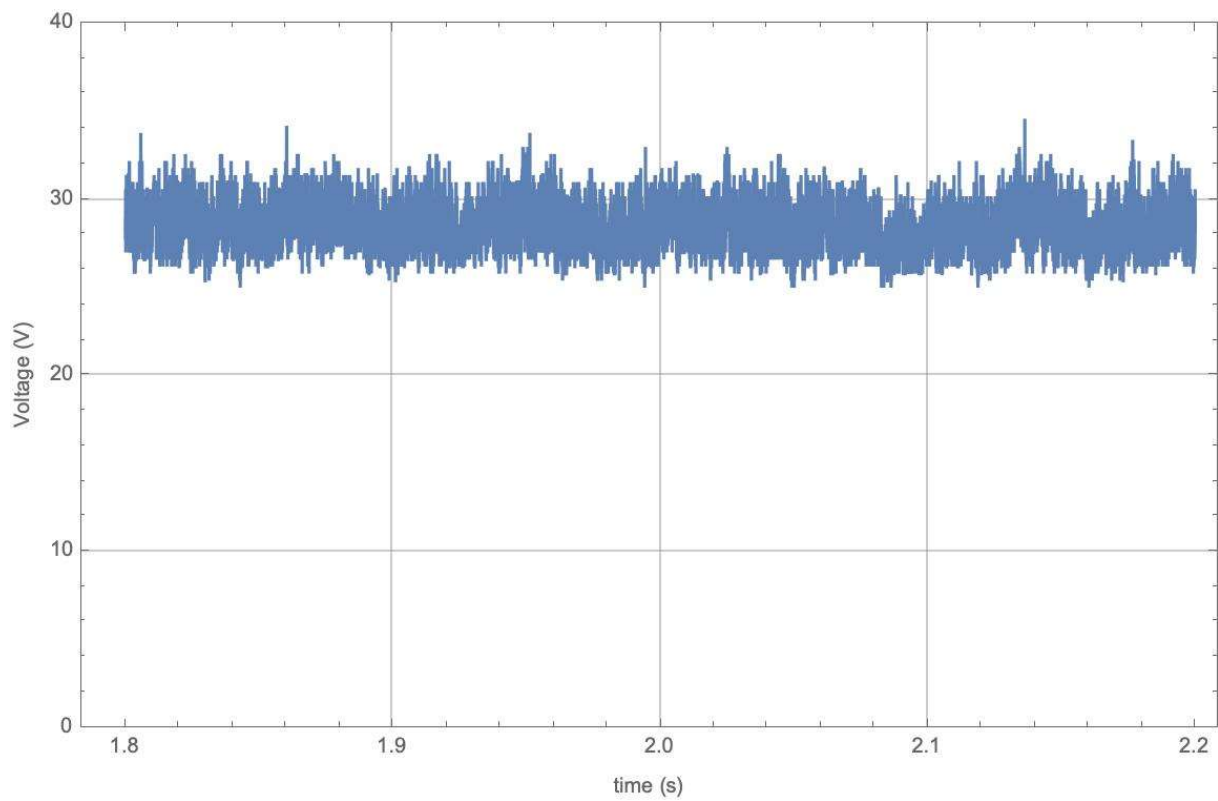


Figure 2: arc voltage.

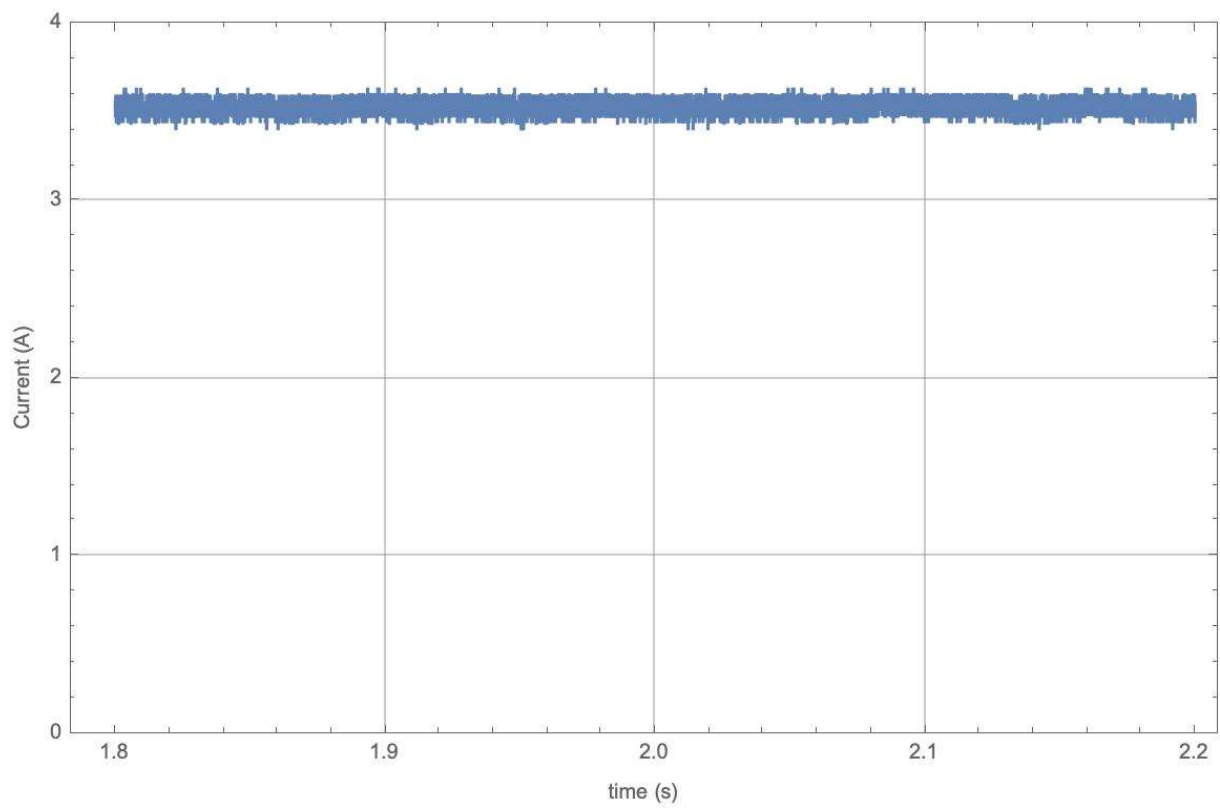


Figure 3: Arc current.