

Data set of the paper “Changes in processing characteristics and microstructural evolution during friction extrusion of aluminum”
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The data set consists of the main folders:

- Extrusions
- Mechanical testing
- Microstructure

The folder “Extrusions” contains:

- The extrusion data of the wires used for metallography, which were mentioned in the paper.
- The extrusion files of the parameters combinations mentioned in the paper as well as their repetitions.
- .xlsx file of the temperature measurements with the respective displacement into the plate. Cells named as, for example, “16-300-90 (Process number 207)” refer to the temperature measurement executed for an extrusion using 16 kN, 300 min⁻¹, 90° die angle, characterizing the process number 207.
- Subfolders were organized by die angle and extrusion parameters.
- Being a certain combination of extrusion parameters used for analysis of the microstructural evolution of the base material, the respective separation can be found in subfolders as “Base material” and “Wires”.
- .txt files named as “record_file280” refer to the process number 280. Such files were directly provided by the machine used to perform the extrusions. In the first lines of the file - from “Phase Antasten:” until “Kraft-Sicherheitsgrundfaktor Abschaltung” -, it lists the machine settings that remained constant for all extrusions. The extrusion parameters of interest and used in the paper can be found in the columns “Zeit” (time in milliseconds), “Kraft_Z” (extrusion force in Newton), “Weg_Z” (displacement in millimeter), “Spindeldrehzahl” (rotational speed in minutes⁻¹), and “Spindelmoment” (torque in Newton.meter).

The folder “Microstructure” contains:

- Optical Emission Spectrometry data in a .xlsx file, providing information about the chemical composition of the base material used in the extrusions.

- The microstructure of the base material and of the wires. The folder dedicated to the microstructure of the wires is separated by the respective die angle and extrusion parameters used.
- Folders named as, for example, “18.300.60.229” refer to the process number 229 in which 18 kN, 300 min^{-1} , 60° die angle were used as extrusion parameters.
- Pictures were named as, for example, “16.300.45.RegionA.109” refer to a microstructure observed in a wire extruded with 16 kN, 300 min^{-1} , 45° die angle, configuring the process number 109. “Region A” refers to the region from where the picture was captured, relative to the regions A, B and C described in the paper.

The folder “Mechanical testing” contains:

- .xlsx hardness mapping file of a wire extruded with 16 kN, 300 min^{-1} , 90° die angle. The file also illustrates the regions taken in consideration for hardness estimation.
- .xlsx file of the tensile tests presented in the paper. Cells named as, for example, “16-300-60 (Sample 12, Process Number 125)” refer to a sample obtained from the wire extruded in the process number 125, in which 16 kN, 300 min^{-1} , 60° die angle were used as extrusion parameters. “Sample 12” refers to an internal nomenclature used in the experimental procedure of tests.