

*** Laser-Induced Breakdown Spectroscopy (LIBS) Scanning Data of Recycled Building Materials ***

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General Introduction

This dataset contains spectral data obtained from scanning various recycled building materials using Laser-Induced Breakdown Spectroscopy (LIBS). The objective of the study was to distinguish the components of recycled construction materials such as cement, wood, glass, and other substances. LIBS provides detailed spectral signatures corresponding to the elemental composition of these materials, aiding in the analysis of the quality and composition of recycled concrete aggregates (RCA).

Each file represents spectral data for a specific recycled building material under consistent experimental conditions. The file names follow the format: nr-###_Material_20Hz_100usInt_170mJ_Delay1us_Offset253-4_withFlow.h5

- nr-### refers to the sample number.
- Material refers to the material type (e.g., Glass, Gypsum, Brick).
- 20Hz denotes the frequency of the laser.
- 100usInt indicates the integration time of 100 microseconds.
- 170mJ refers to the energy of 170 millijoules used in the LIBS process.
- Delay1us indicates a delay of 1 microsecond in data acquisition.
- Offset253-4 represents the specific offset used during the experiment.
- withFlow.h5 indicates that the data was collected with material flow.

Methodological Information

- Data Collection Method: The data was collected using Laser-Induced Breakdown Spectroscopy (LIBS), a technique that uses laser pulses to ablate material from the surface, creating a plasma that emits light. The emitted light was collected and analyzed to provide spectral signatures of the material components.
- Instrument Information: The LIBS system was configured with a laser frequency of 20Hz, an integration time of 100 microseconds, and an energy pulse of 170 millijoules. The delay time was set to 1 microsecond to optimize plasma signal collection.
- Software Used: Data was processed and saved using Python libraries compatible with .h5 format.
- Quality Assurance: Data was checked for consistency by ensuring that each material was scanned under the same conditions, and outliers were manually inspected for potential errors during the experiment.

Sharing and Access Information

This dataset is provided under the Creative Commons License. You are free to use this data for academic and research purposes, provided appropriate credit is given to the authors.