Processing Data: The UnPacked Case

In this document, we describe how we processed the DBD data with no packing. It is conceptually the same as the packing case.

How it differs from the packed case:  
i) each folder contains only raw data for each run.

ii) all of the raw data is collected into all\_cm\_no\_packing

iii) processing is done all at once, instead of for each individual interlectrode gap. The jupyter notebooks used (.ipynb) are the same for this task.

We manually collect the title data into an excel file, ‘data\_col\_vvm.xlsx’. We record the conditions of each run (flow rate, packing size, reactor height, etc) in the title of each run. So we have three types of data: “title” data, OES data, and circuit data. We want to add the electron temperature data to this excel, which doesn’t exist yet. We process the OES data through Spectrum Analyzer 1.97 for each file and produce the electron temperature data.

We then use “dbd\_to\_excel.ipynb” to cycle through all of the collected data files and extract circuit data. This will output an excel fie: “data\_col\_no\_packing\_dbd.xlsx.” Note: the column “packing size” must be changed to “packing\_size” (add an underscore between the words”. This is required for the next step.

This data can now be ran through the Jupyter Notebook containing the physics model. This is “Physics\_Pyomo\_EB\_Looping\_V2\_diff\_excel\_sheets \_v3.ipynb”.

The Jupyter Notebook containing the physics model has 3 output files. For this unpacked case, the output files are:

1. “data\_from\_EB\_looping\_new\_excel\_new\_code\_no\_packing\_v3.xlsx”
2. “mass\_balance\_params\_no\_packing\_v3.xlsx”
3. “energy\_balance\_params\_no\_packing\_v3.xlsx”

Only “data\_from\_EB\_looping\_new\_excel\_new\_code\_no\_packing\_v3.xlsx” is used in subsequent analysis for discovering dimensionless numbers. Go to the folder “He\_code\_new”.