

# LIBS of Sputtering Targets

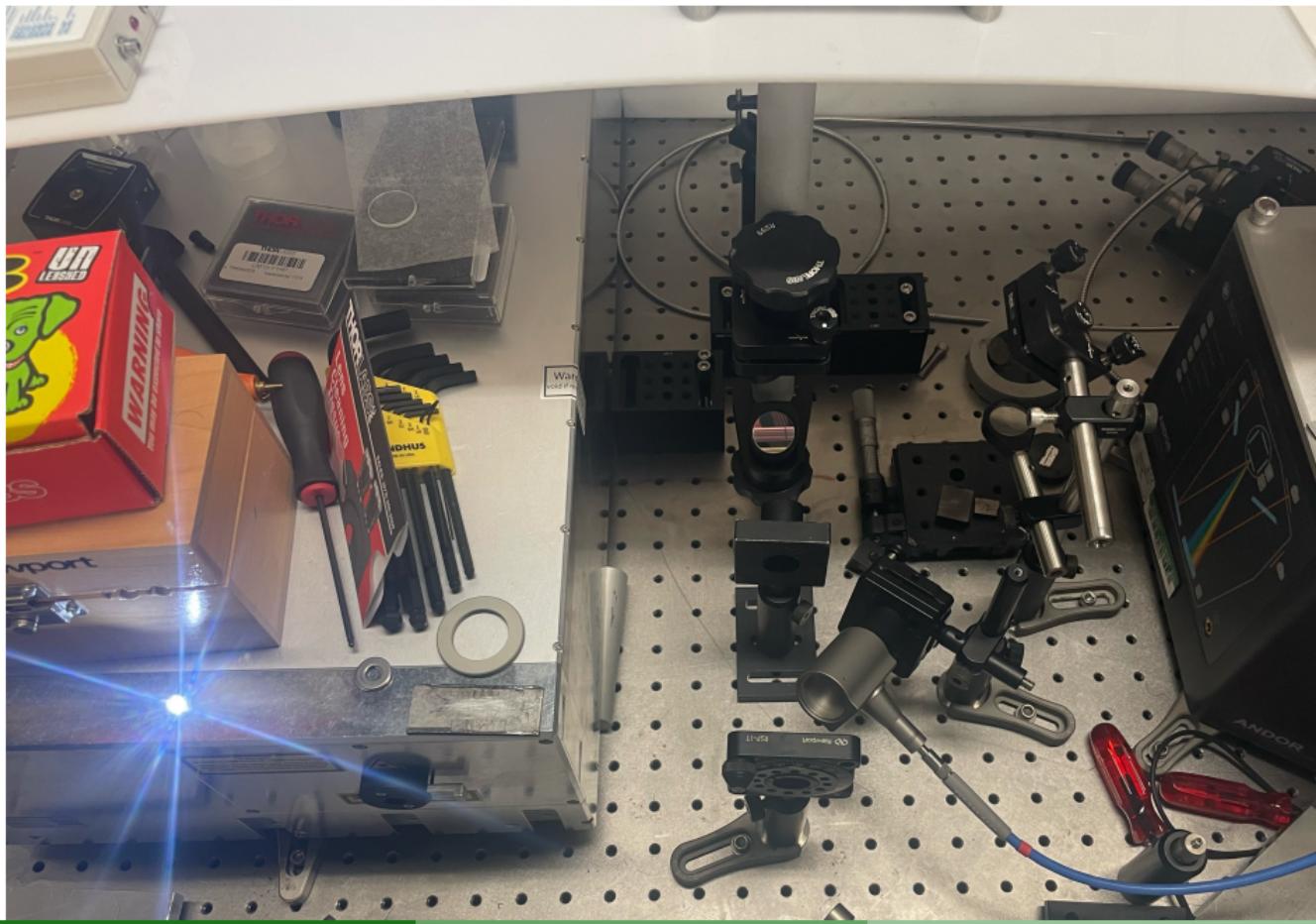
Brian Squires

University of North Texas

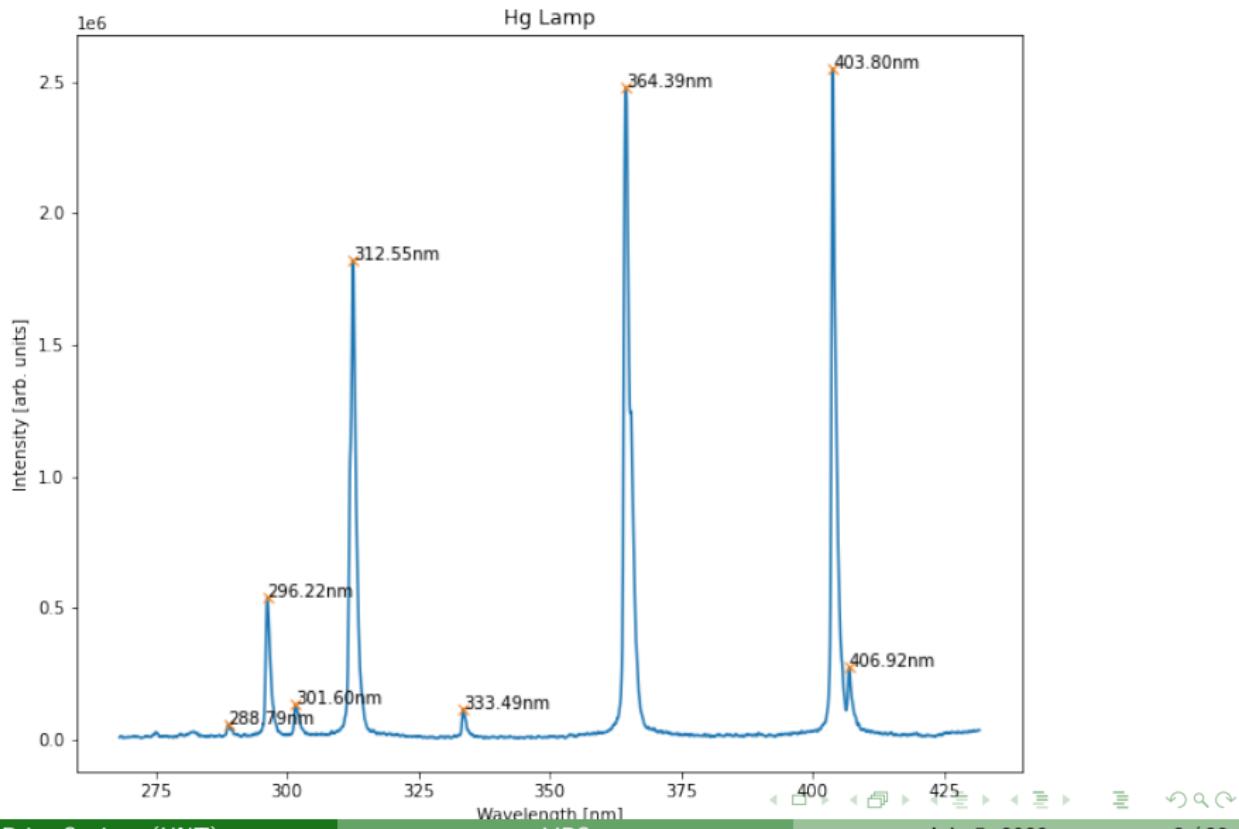
*Department of Physics*

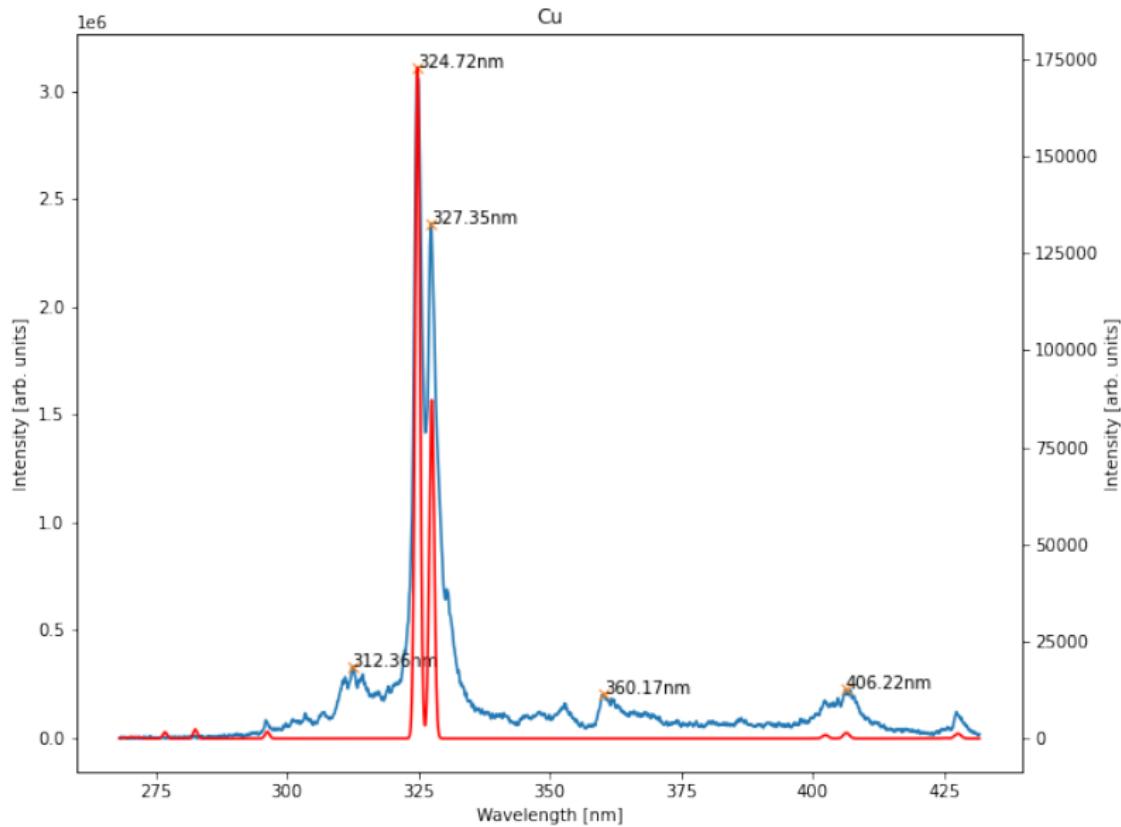
*brian.squires@unt.edu*

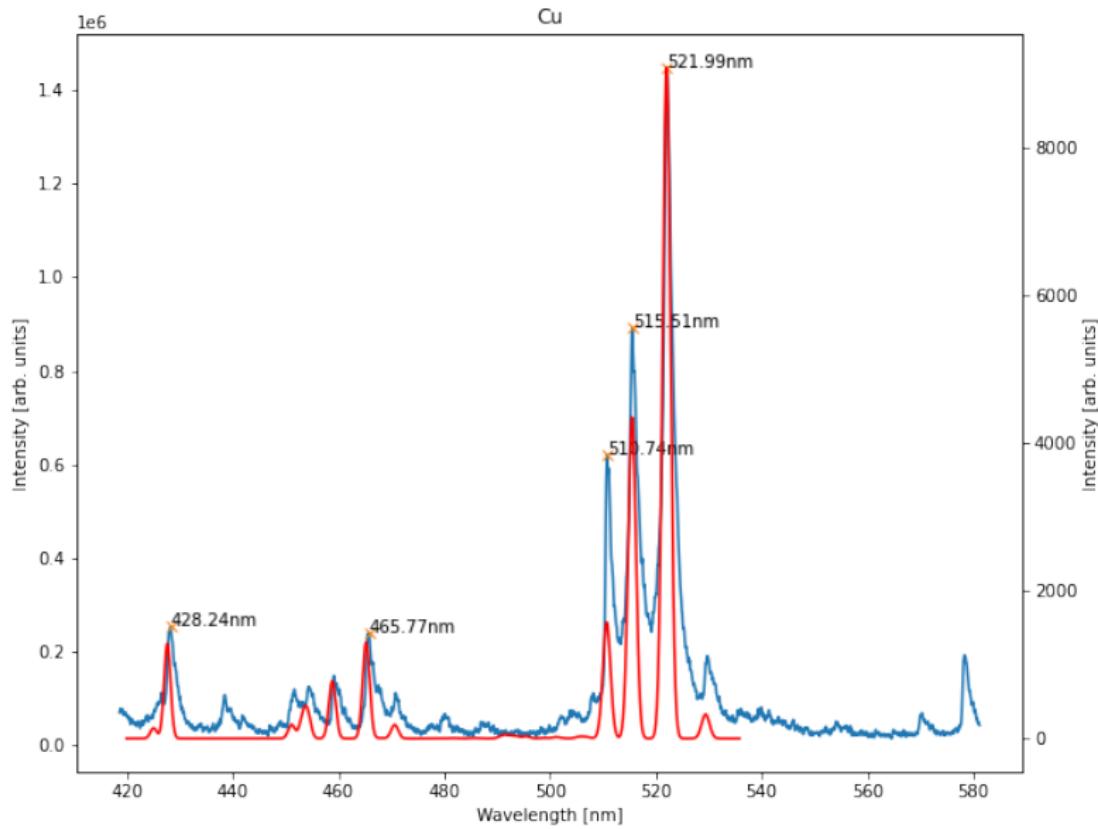
July 5, 2022



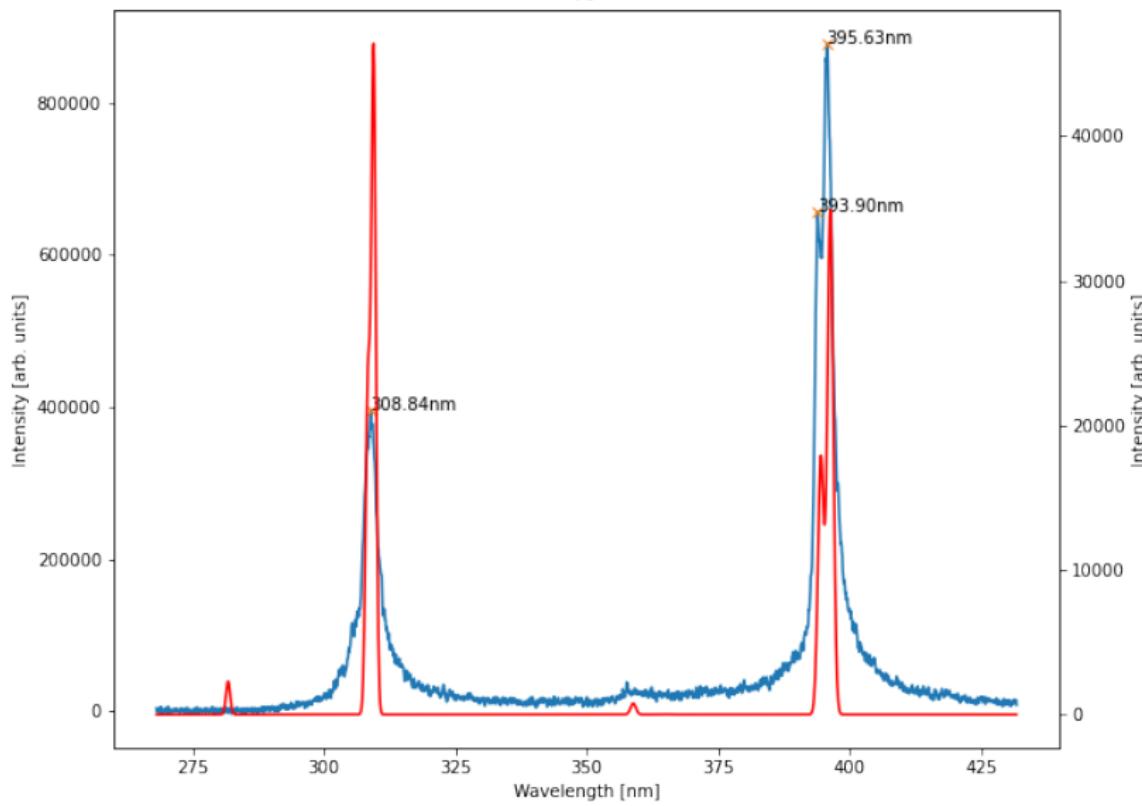
# Average Linewidth = 0.9996nm



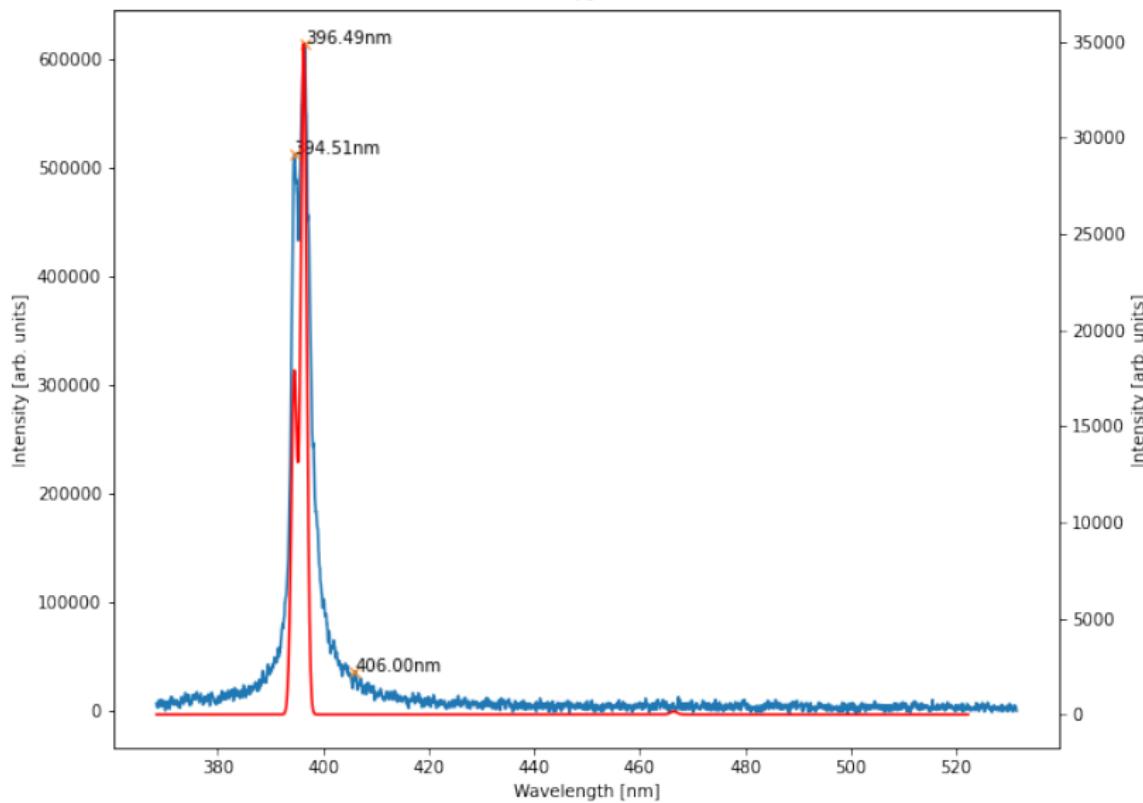




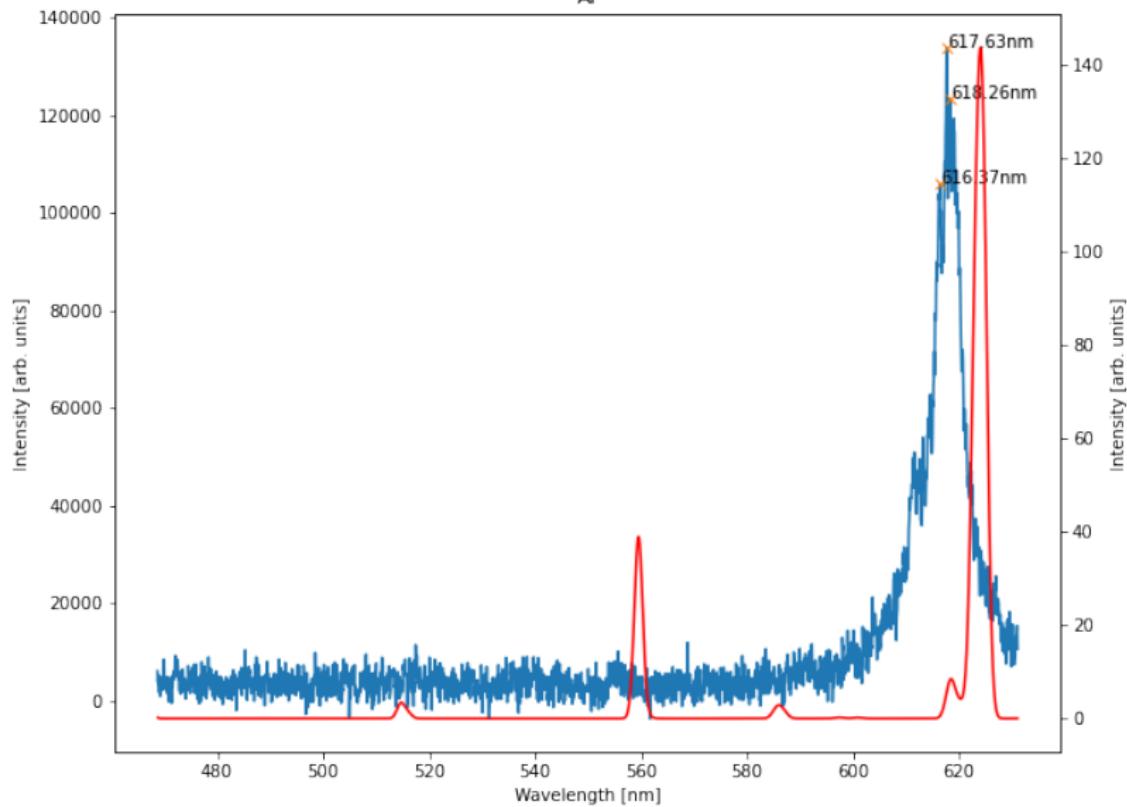
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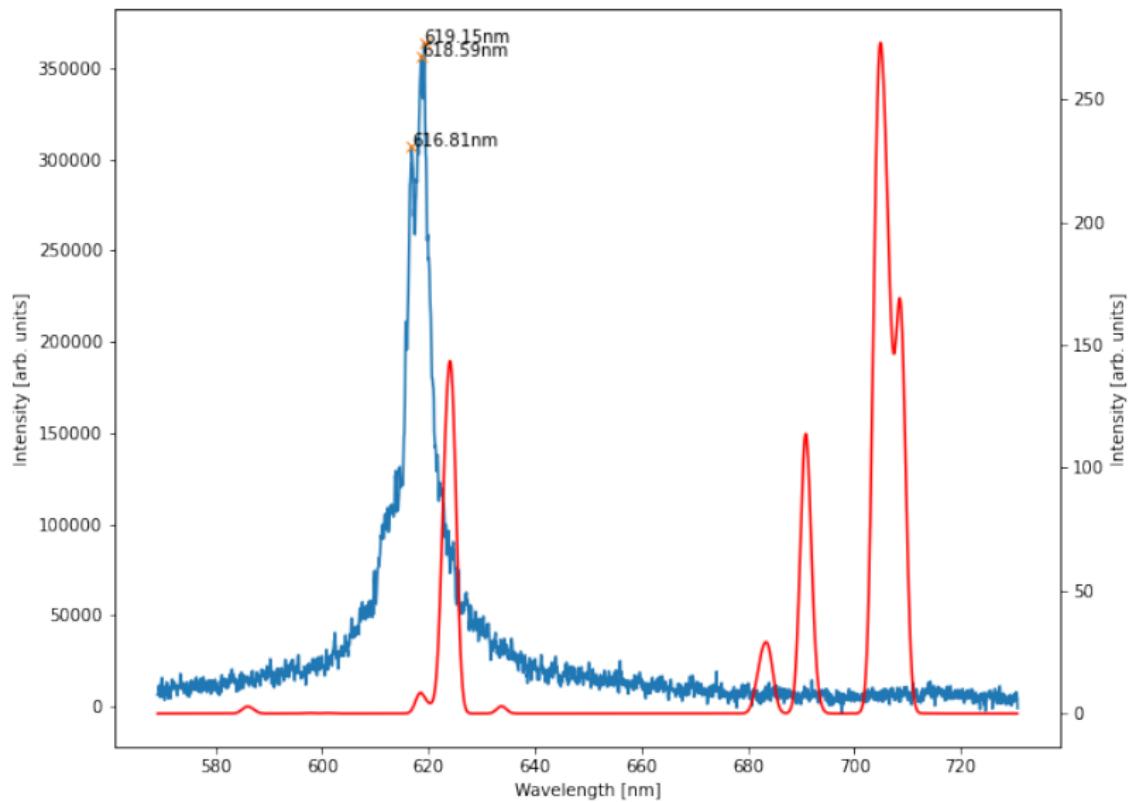
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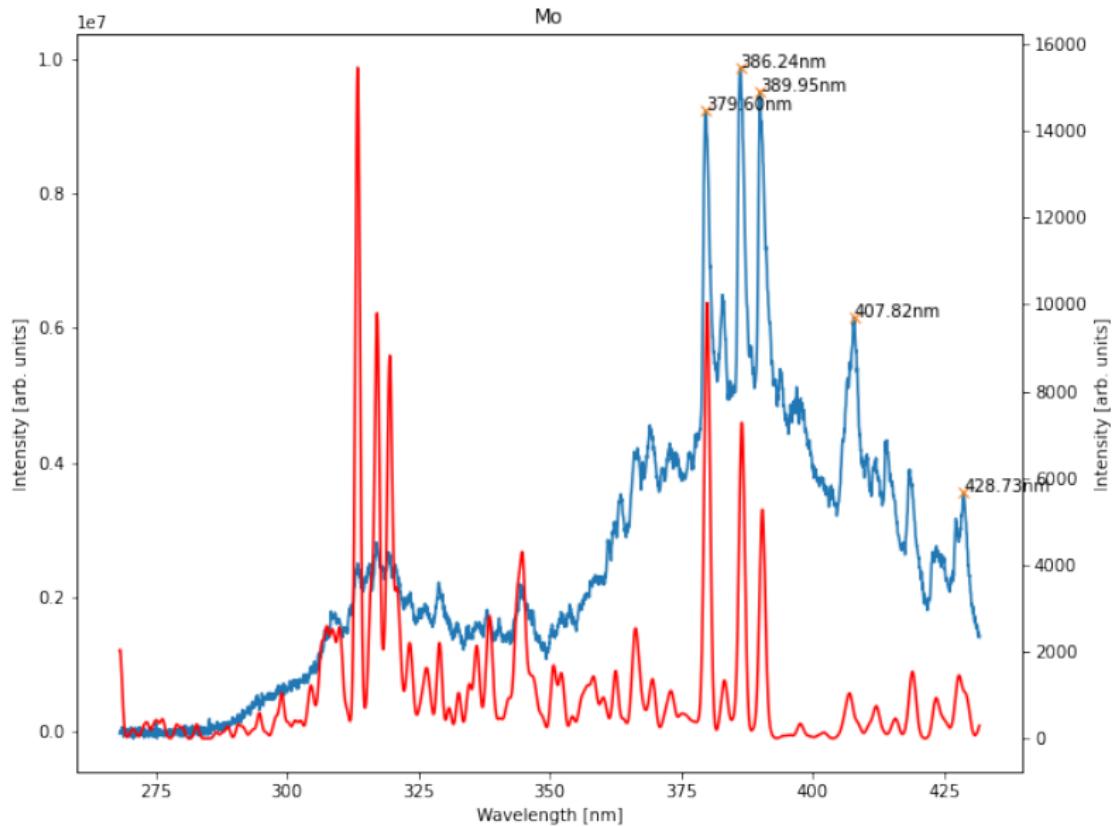


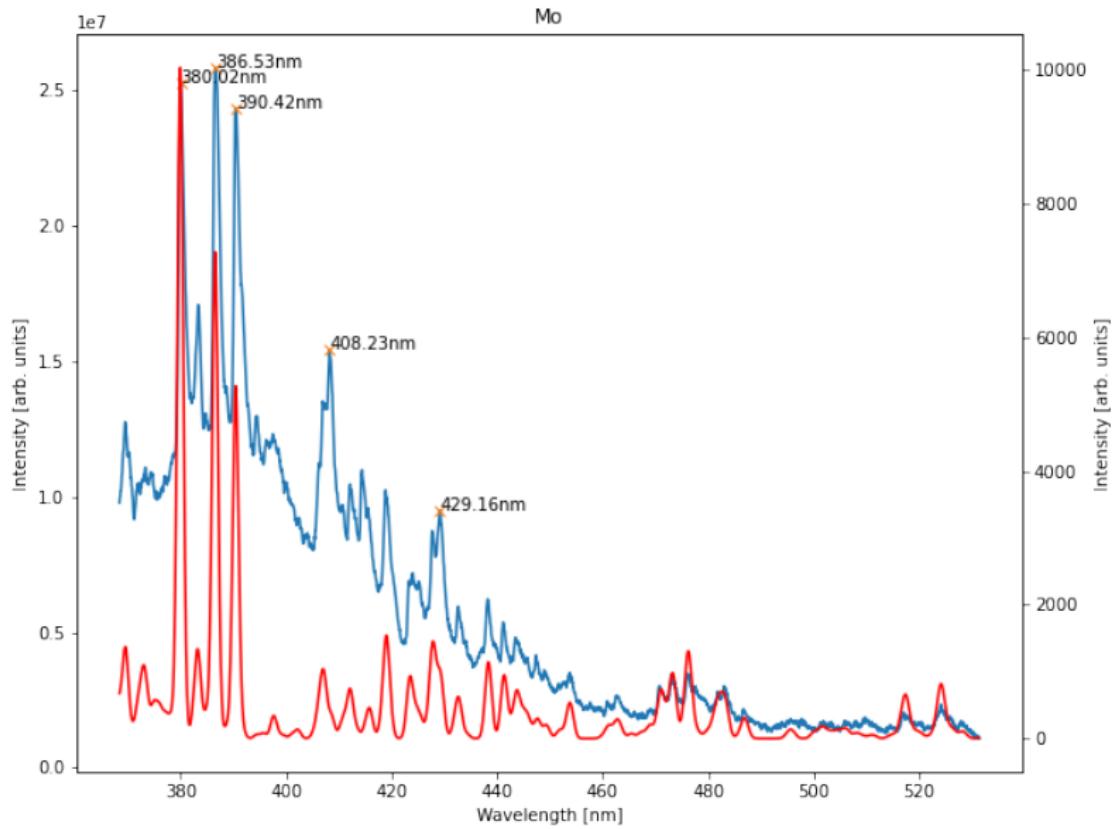
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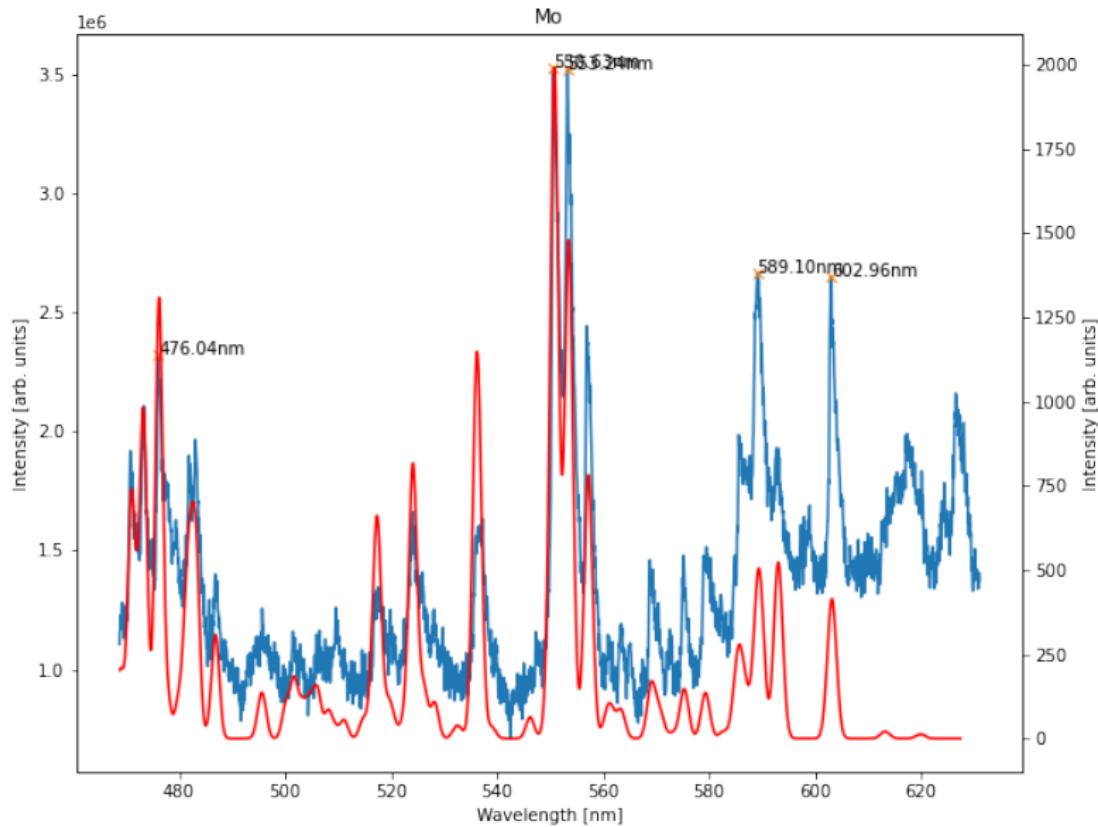


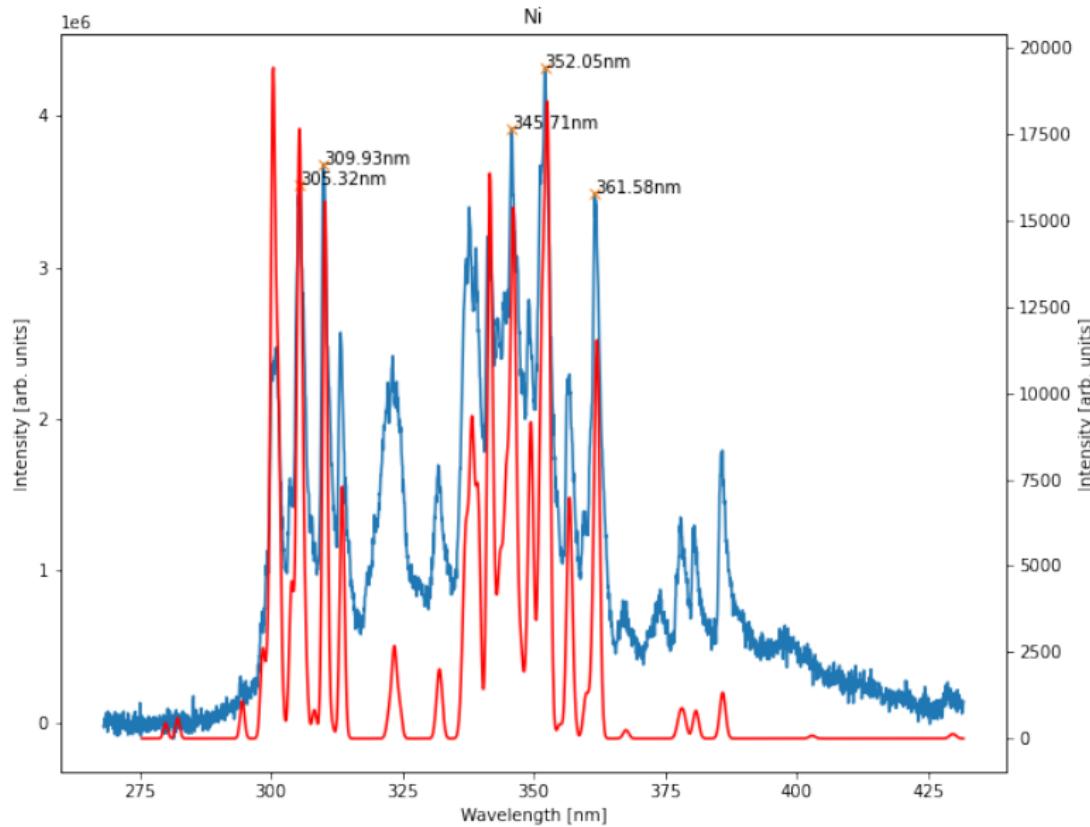
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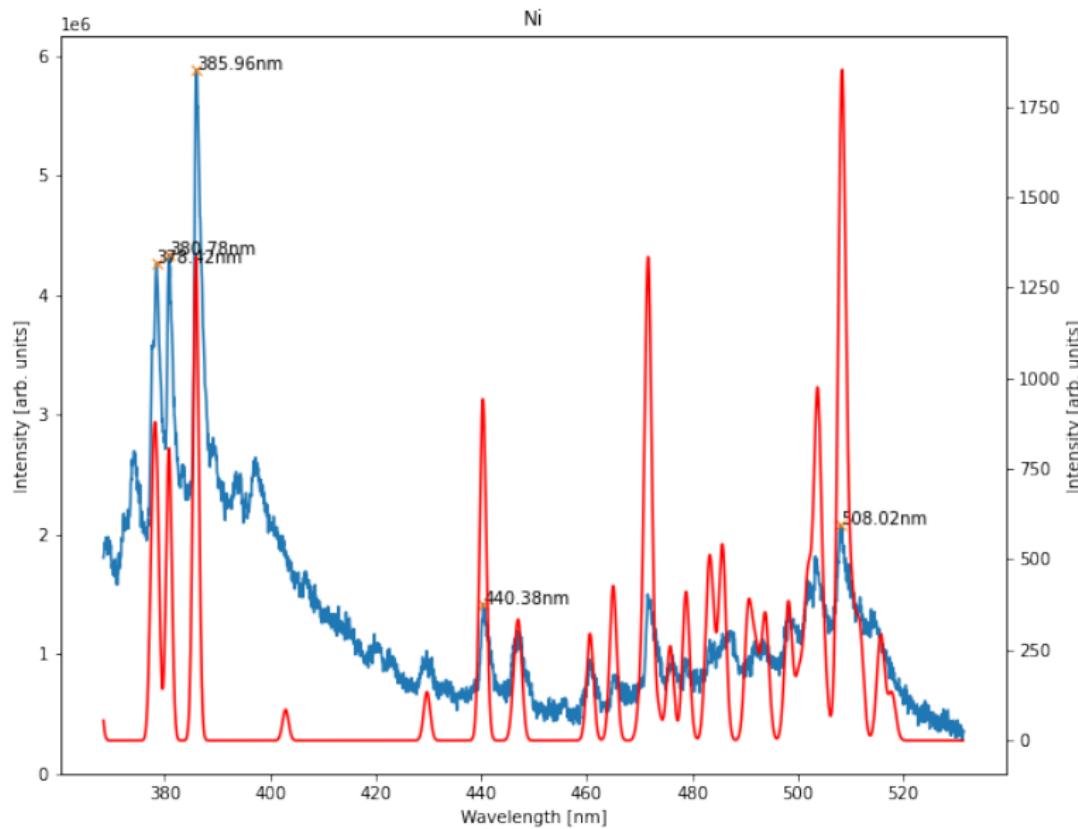


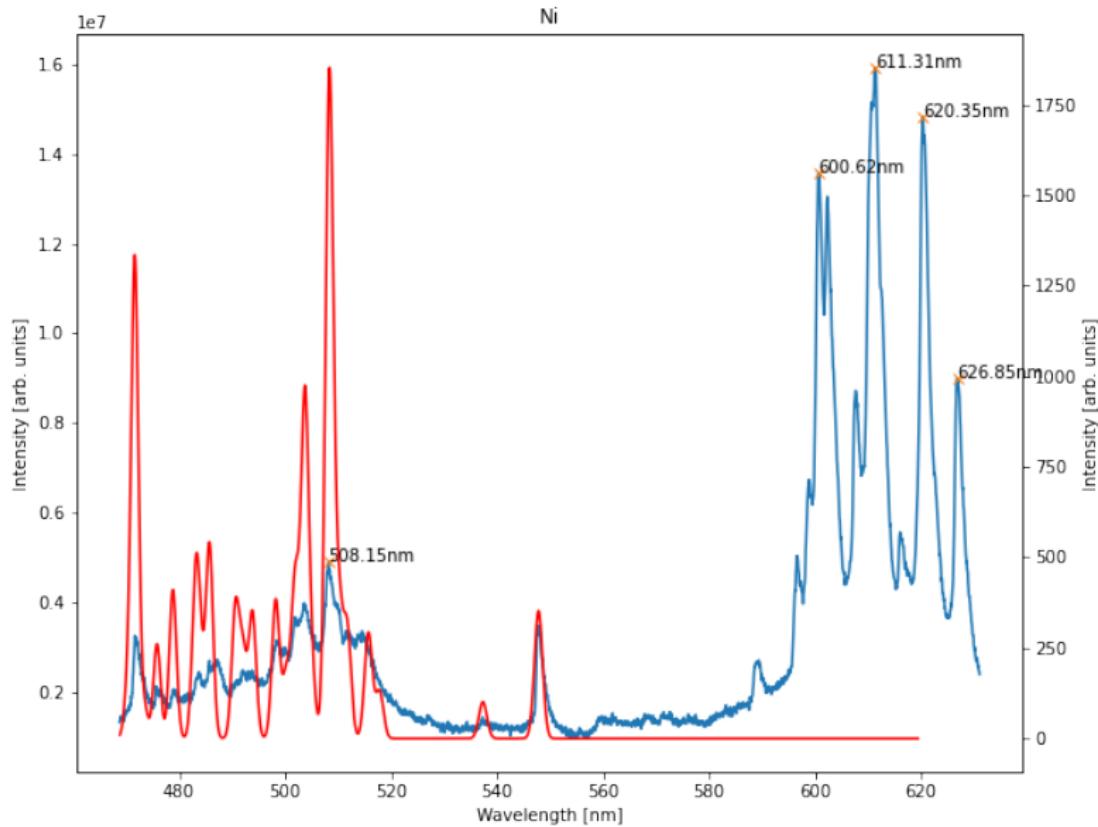


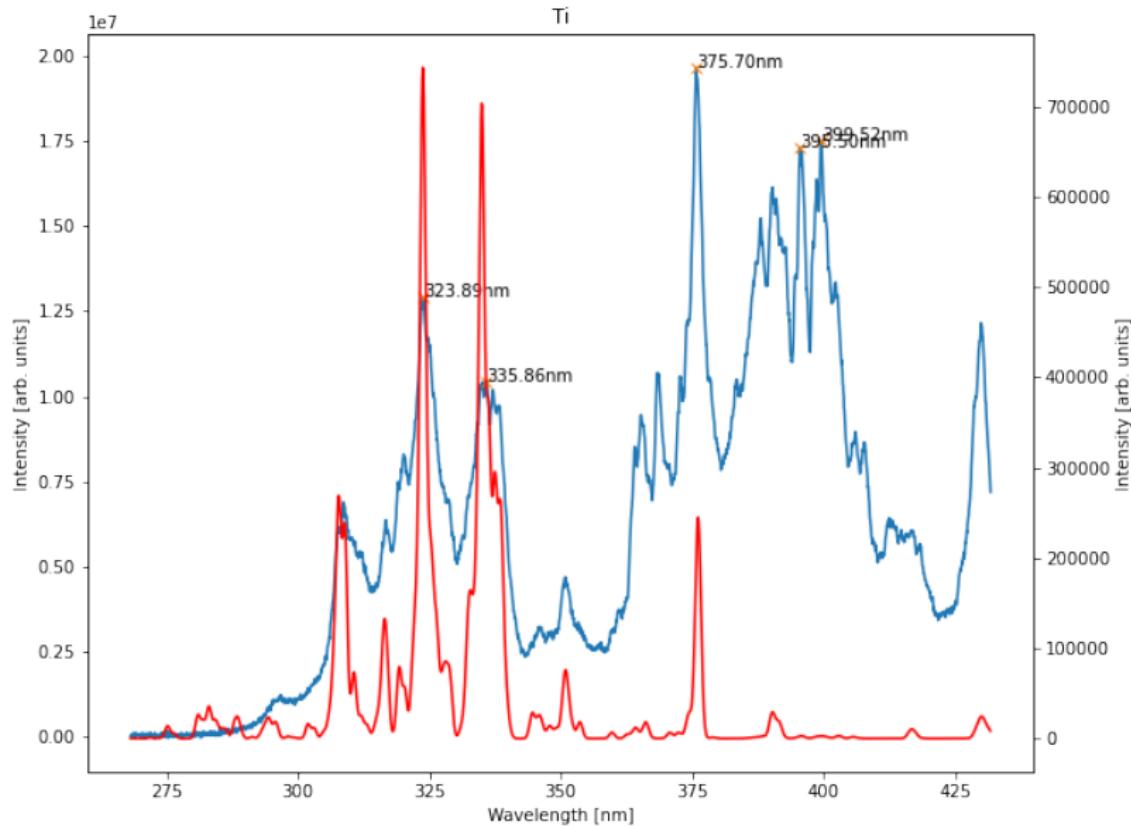




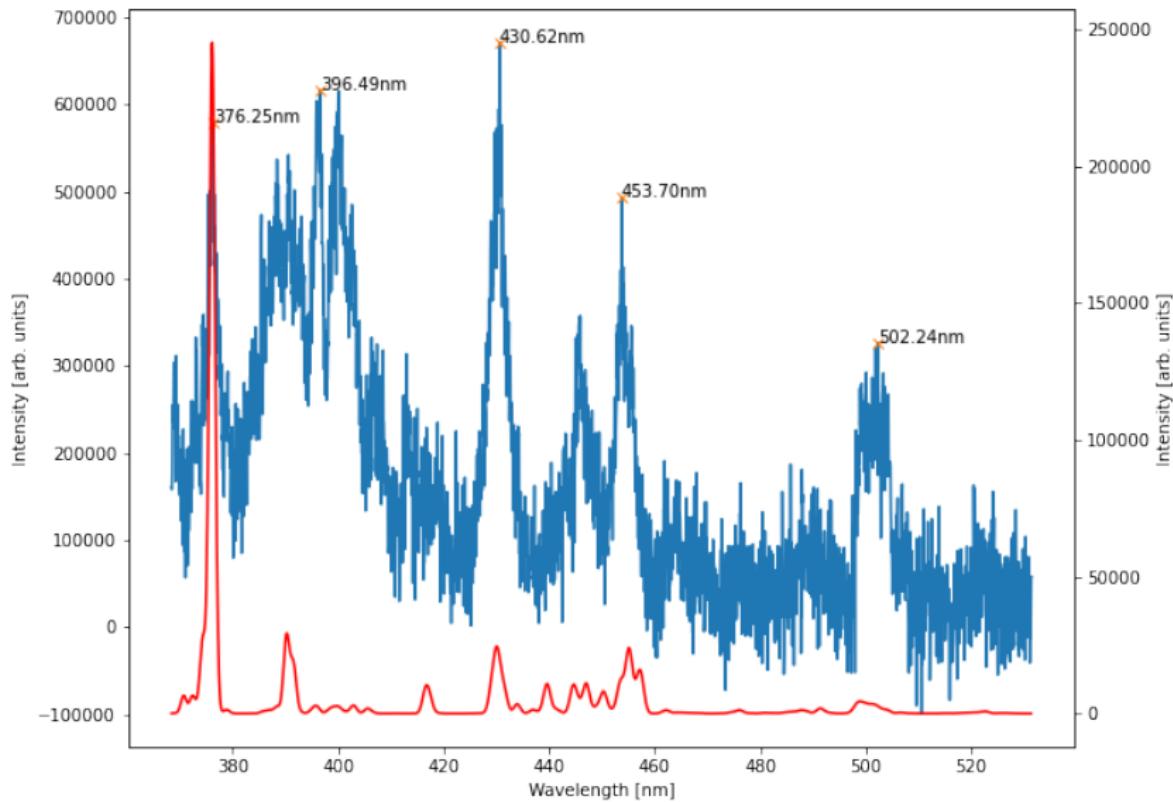


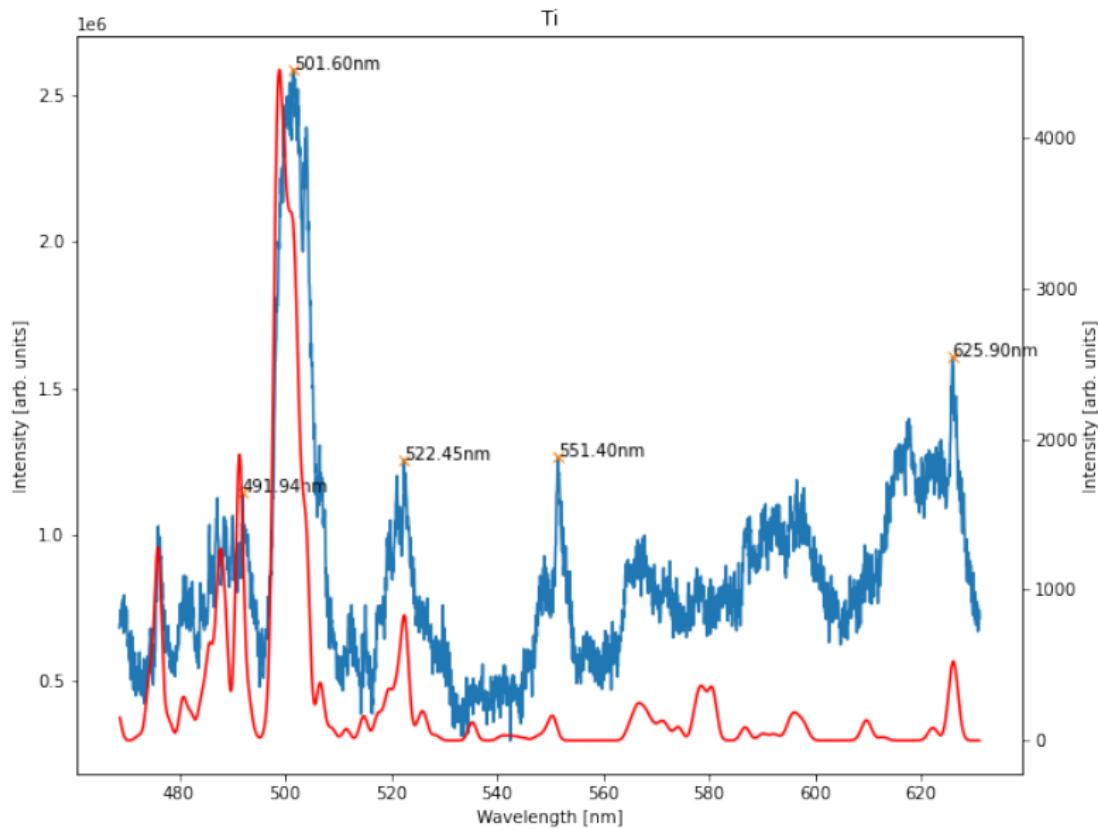


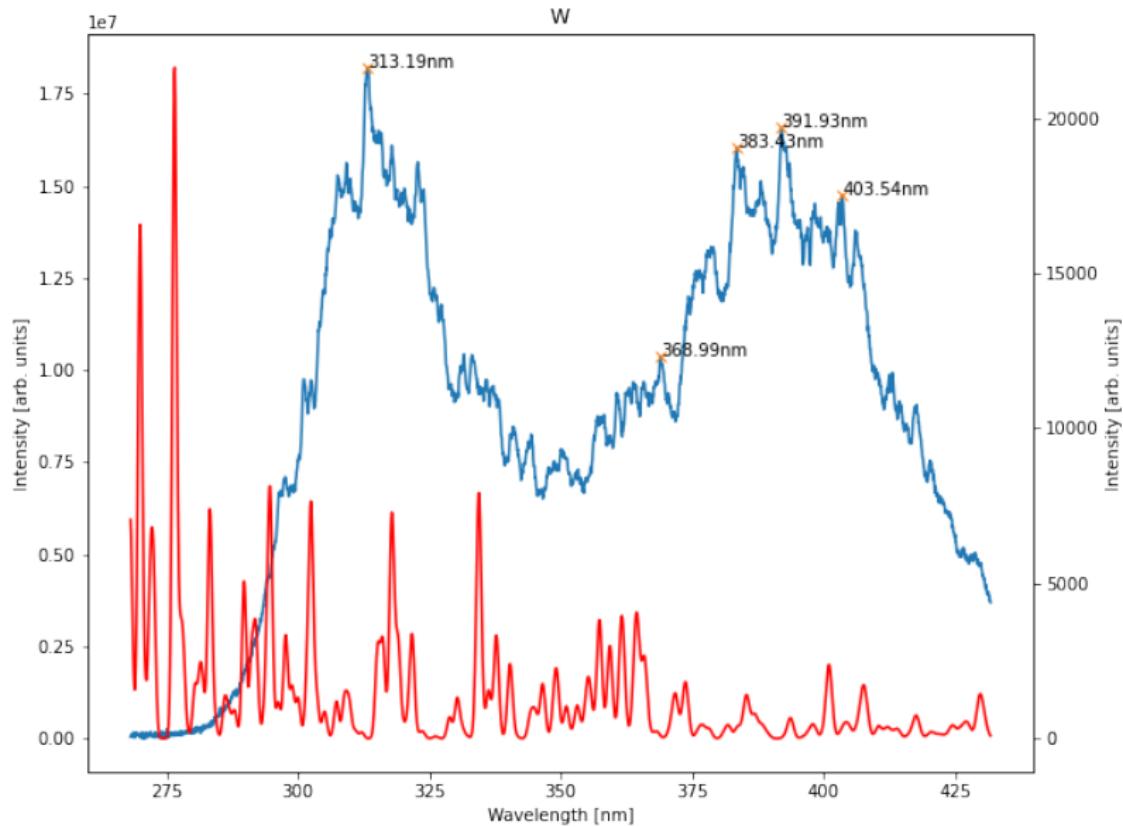


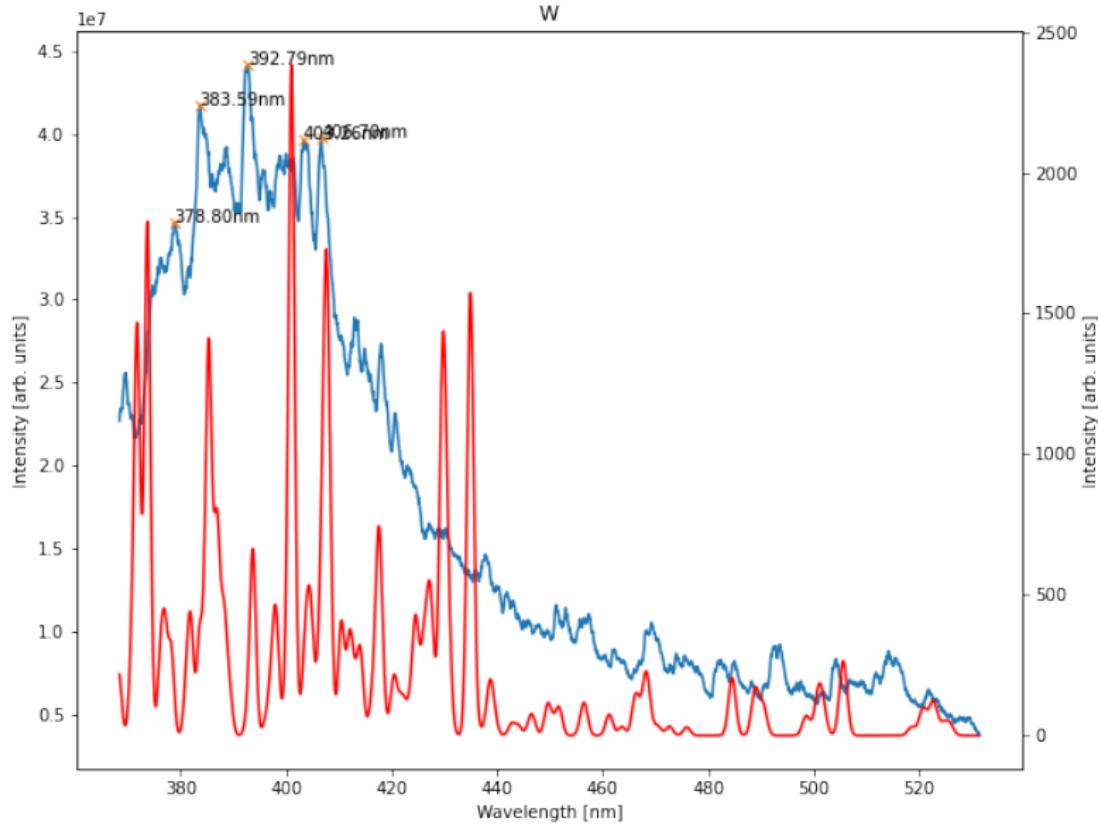


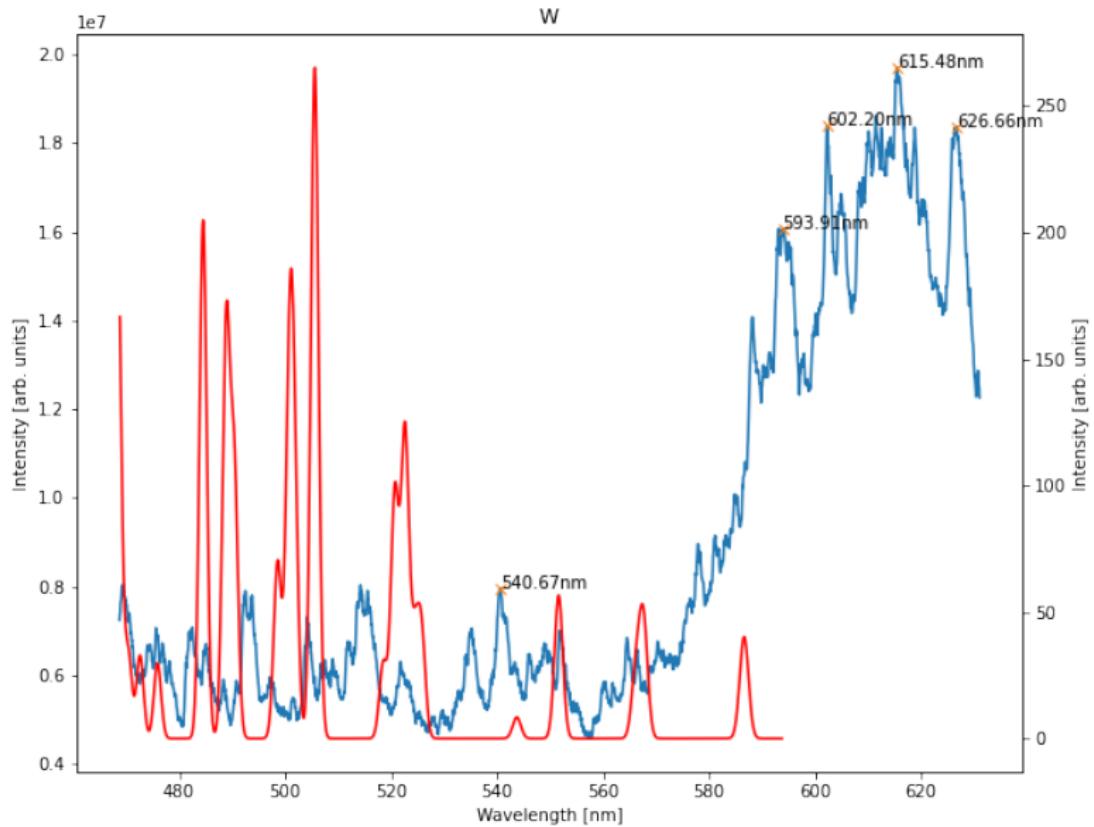
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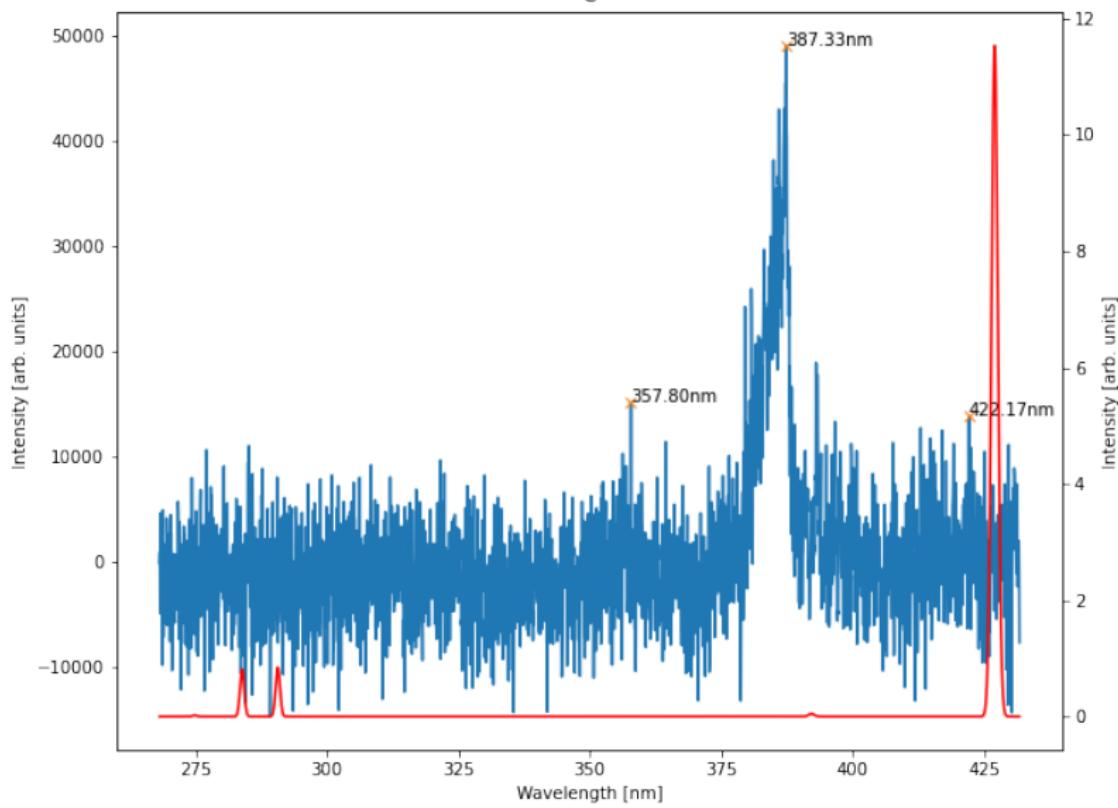




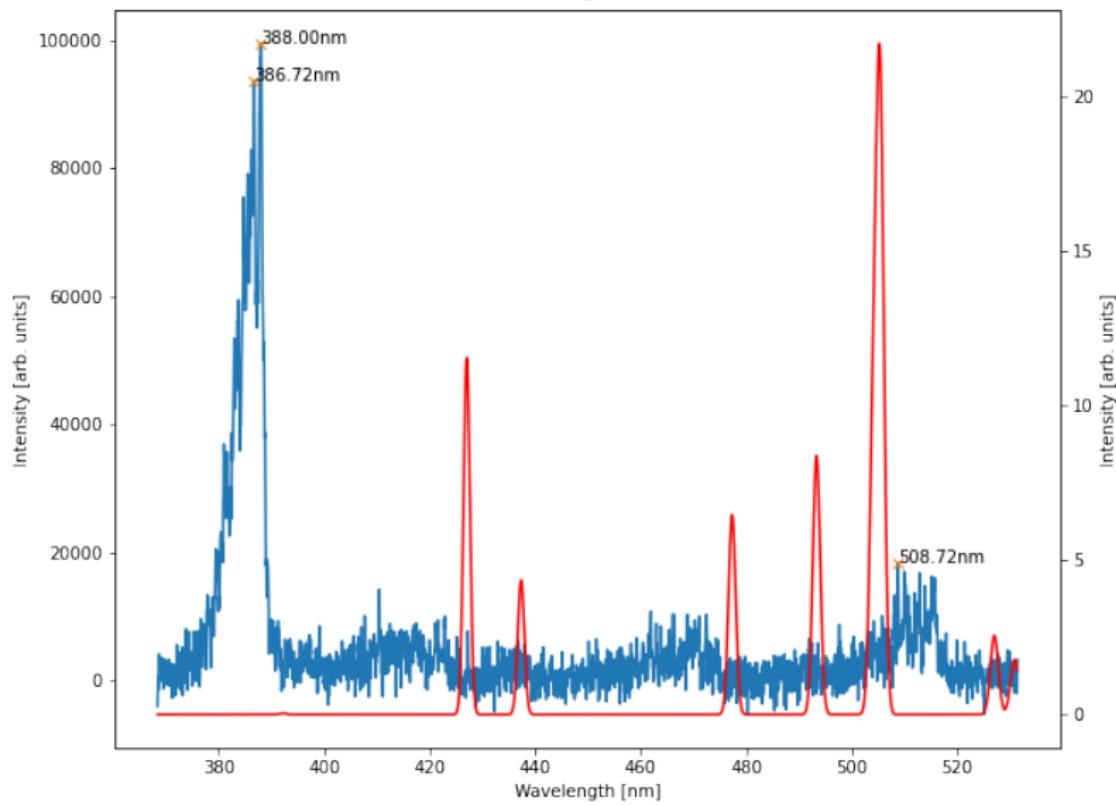


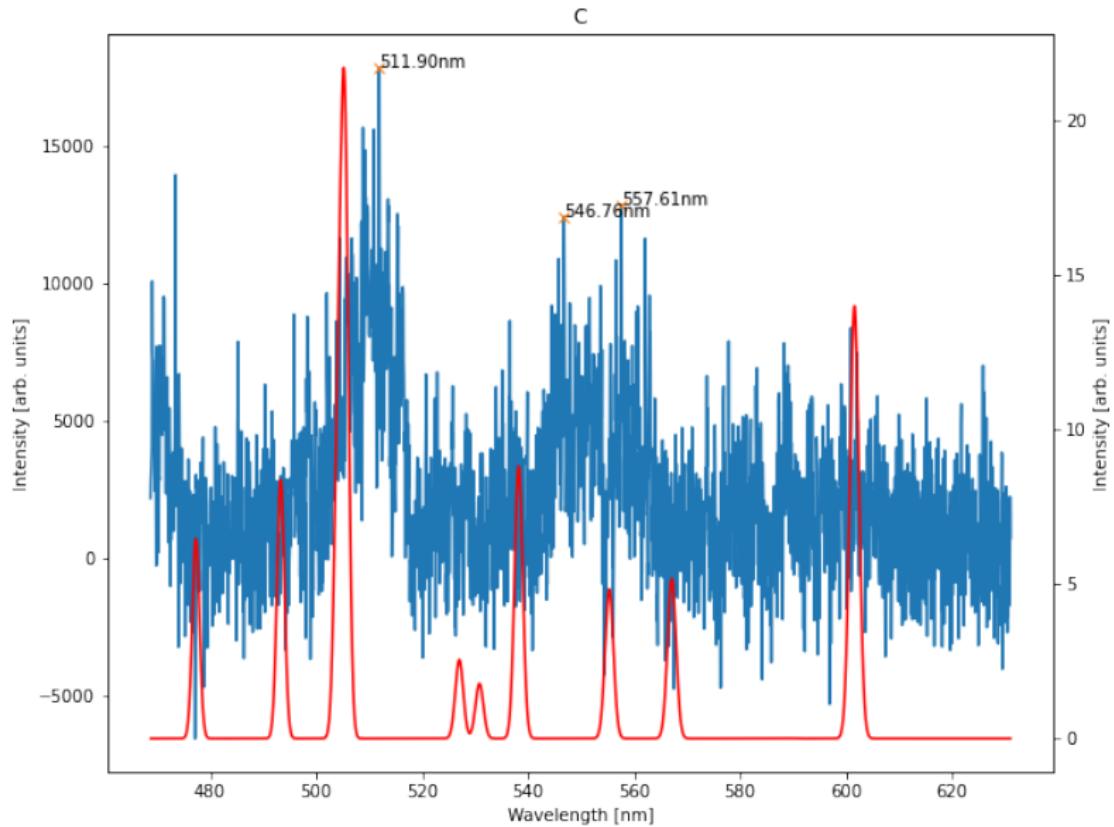


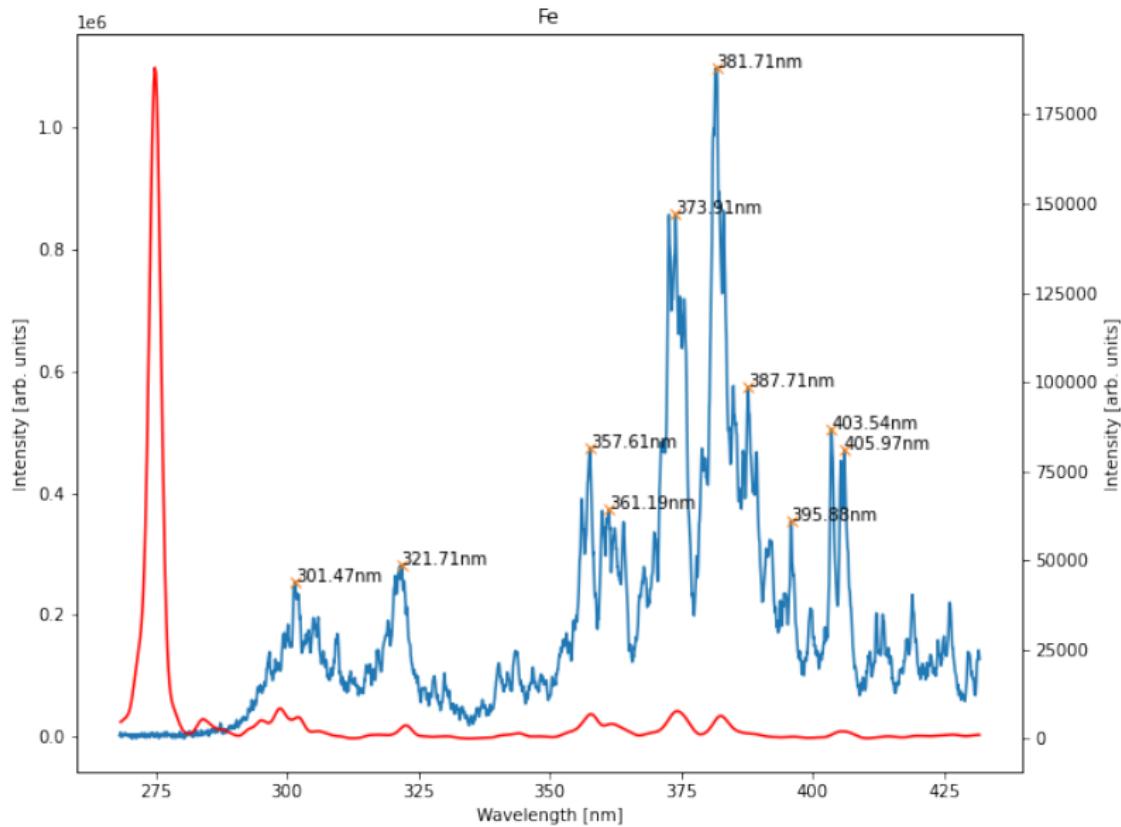
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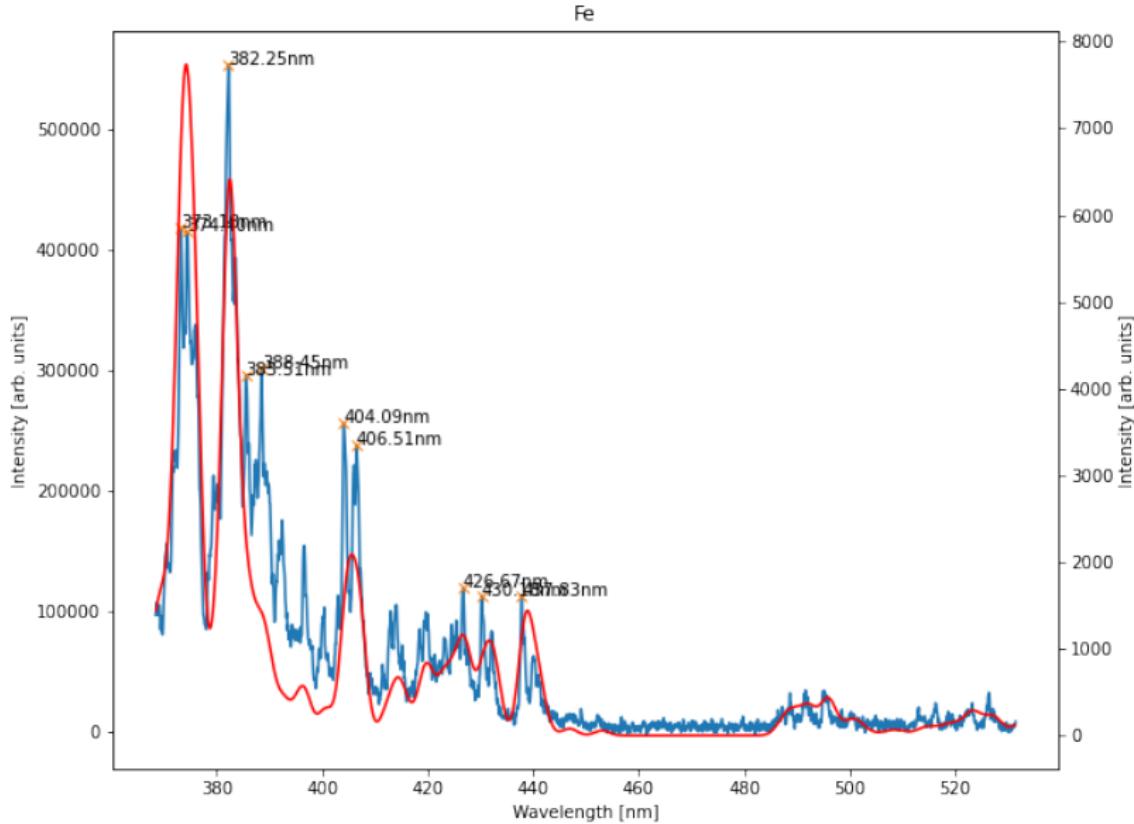


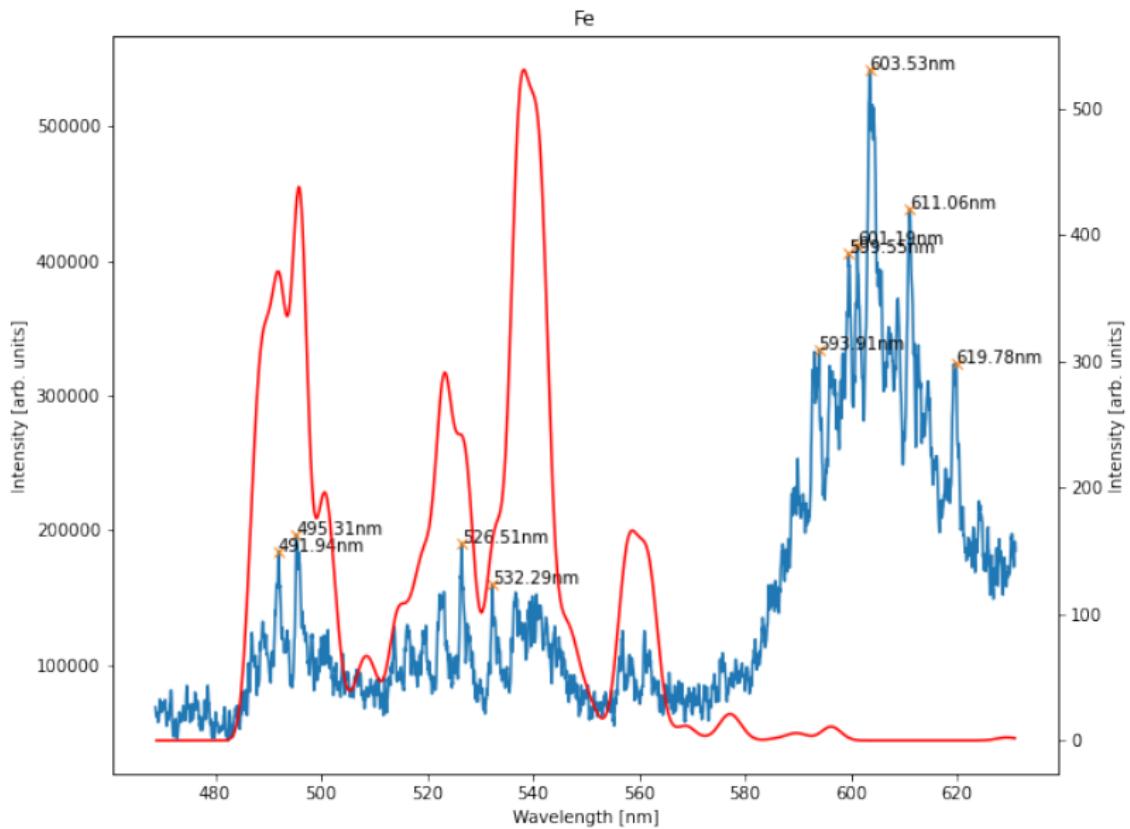
C











# Next Steps

- Optimize optical collection pathway with new lens
  - ▶ New lens ordered
  - ▶ Will enhance collection efficiency in UV
  - ▶ Particularly important for Fe peak at 275nm
- Develop machine learning algorithm for concentration analysis
  - ▶ see Sun, C., Tian, Y., Gao, L. et al. Machine Learning Allows Calibration Models to Predict Trace Element Concentration in Soils with Generalized LIBS Spectra. *Sci Rep* 9, 11363 (2019).  
<https://doi.org/10.1038/s41598-019-47751-y>
  - ▶ Confirm with univariate calibration (concentration gradient sample)
- Perform experiments under blanket of argon
  - ▶ Mitigate molecular LIBS signal (likely from  $O_2$  and metal oxides)
- New mirrors to use 520nm excitation
  - ▶ Should enhance plasma emission by order of magnitude
  - ▶ problem with fiber coupling