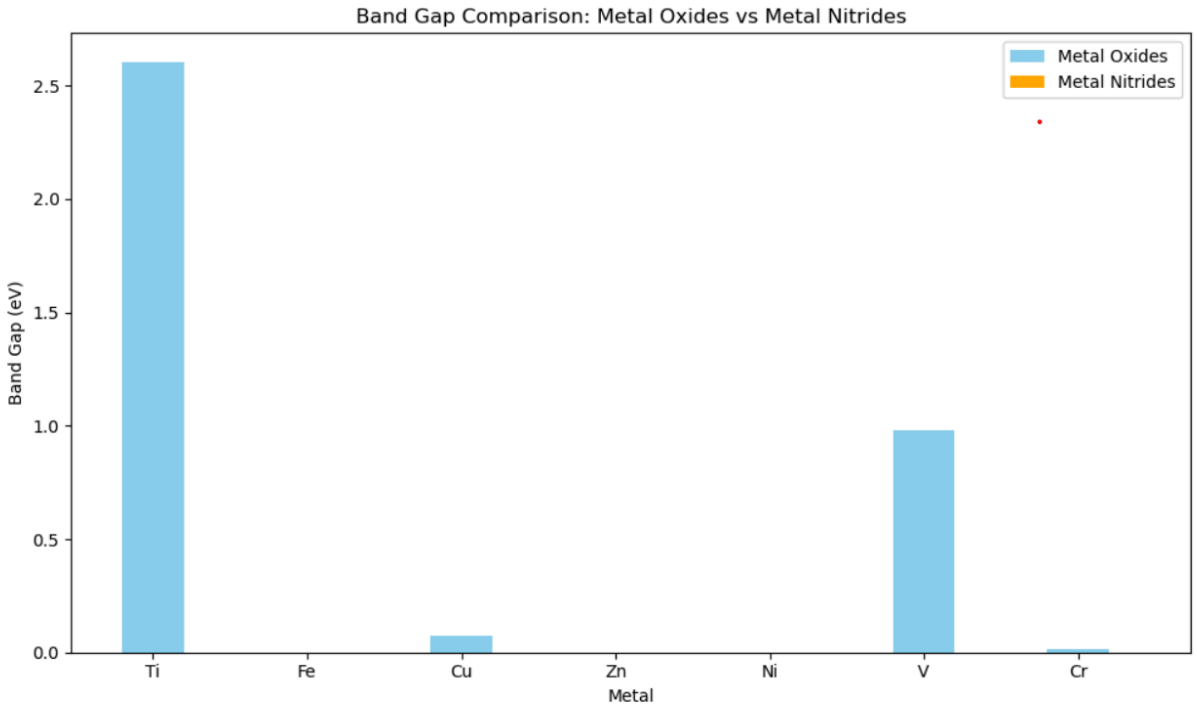
MSE110 Final Project Code Descriptions

Prompt 1.1

- Description: Create a simple script that retrieves and compares the band gaps of metal oxides versus metal nitrides (e.g., TiO2 vs TiN). Generate a basic bar chart showing these differences for 5-10 different metals.
- What my Code Does: This code compares how well different metals conduct electricity when combined with oxygen or nitrogen. It uses the Materials Project API key to connect to a materials database to get band gap data for compounds like metal oxides and nitrides. It then it creates a bar chart to show the differences in band gaps for each metal.



Prompt 5.1

- Description: Create a tool that identifies materials with band gaps in the ideal range for solar cells (1.1-1.7 eV) and ranks them by stability (energy above hull).
- What my Code Does: This code uses the Materials Project API key and database to identify materials with band gaps between 1.1 and 1.7 eV and low energy. It retrieves material data such as ID, formula, band gap, and energy above hull and organizes it in a DataFrame. It then uses Plotly to organize the information into a scatterplot.

	Material ID	Formula	Band Gap (eV)	Energy Above Hull (eV)
406	mp-1196964	Ba3Al3P5	1.4661	0.0
2464	mp-1198489	Hg3H4(IO6)2	1.1443	0.0
9783	mp-31014	ZrP2S7	1.6603	0.0
9781	mp-680356	ZrN6O17	1.5707	0.0
74	mp-1214944	AgRh(SO4)2	1.1739	0.0
2469	mp-3538	Hg3TeO6	1.2369	0.0
2472	mp-29710	Hg4P2O7	1.5885	0.0
80	mp-3922	AgSbS2	1.3716	0.0
84	mp-559257	AgTeO3	1.5732	0.0
87	mp-1198361	Al(BiCl)4	1.4598	0.0