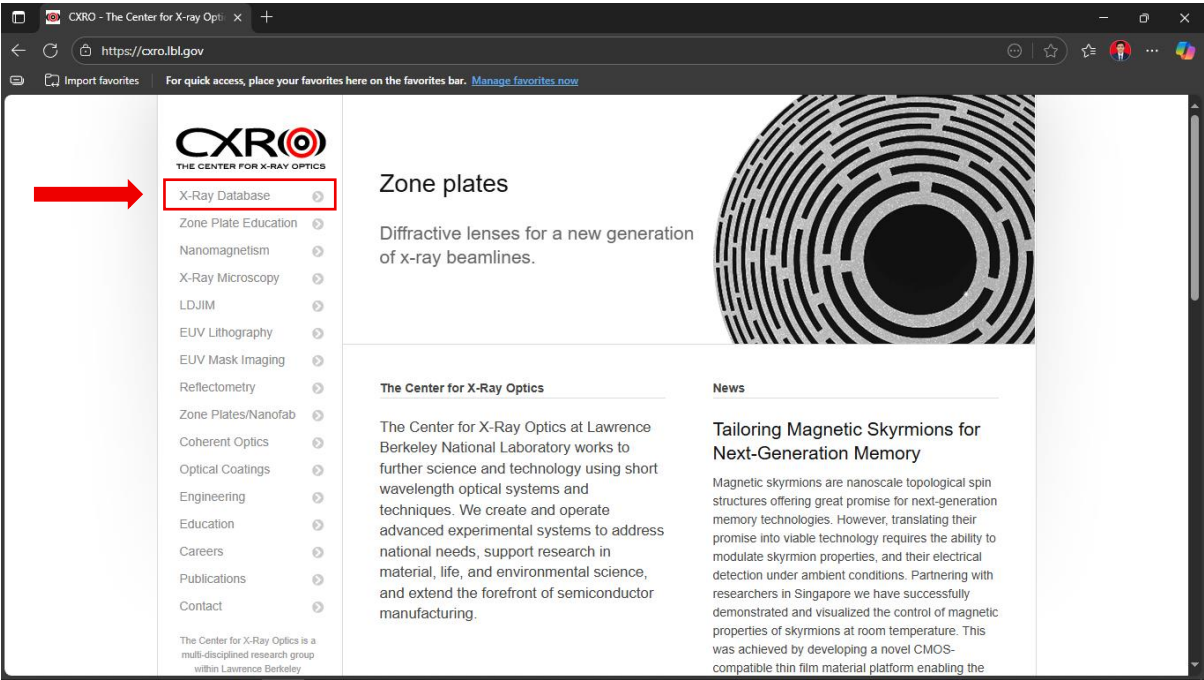
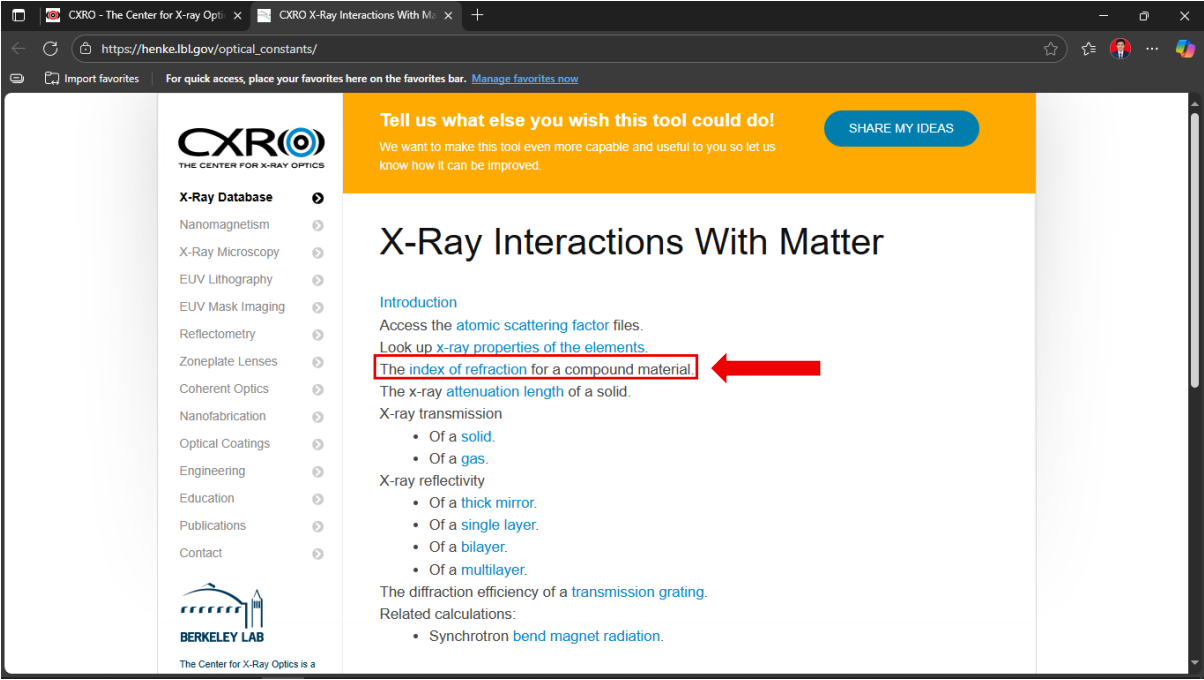


How to Retrieve Refractive Index Data from the CXRO Website

1. Go to the CXRO website (cxro.lbl.gov) then select the “X-Ray Database” menu on the left-hand side panel.

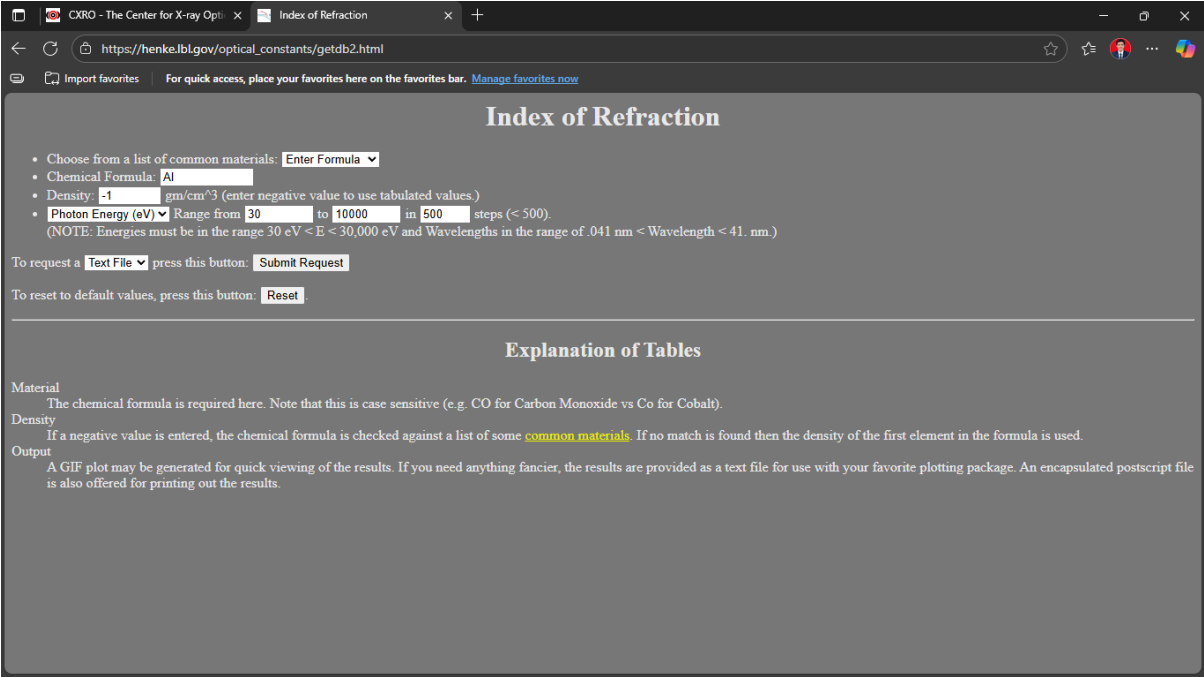


2. Choose the “index of refraction” option.

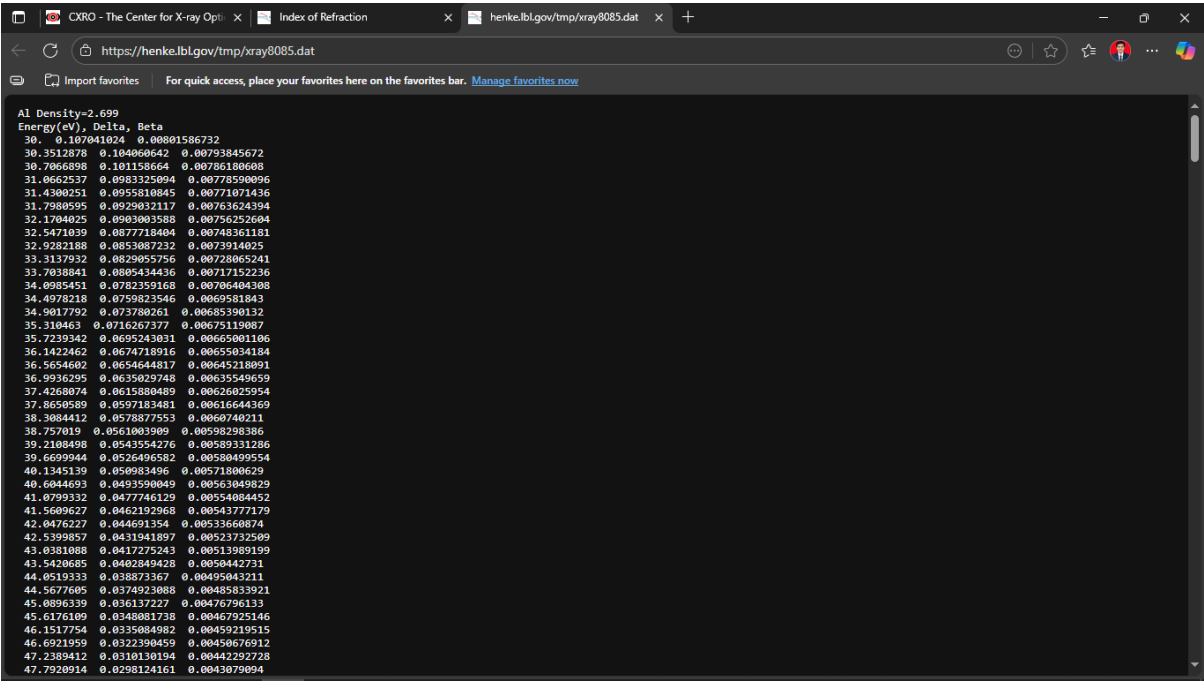


3. Fill all information related to the material being considered.
- Choose from a list of common materials: choose “Enter Formula” if you are looking for a material outside the given list.
 - Chemical formula: write down the chemical formula of your desired material.
 - Density: enter -1 to use tabulated values.
 - If you want to retrieve refractive index data as a function of the incident wave energy, select “Photon Energy (eV)” then enter the energy range that you need. Keep in mind that the energy must be in the range $30\text{ eV} < E < 30,000\text{ eV}$ with a maximum of 500 data points (steps).
 - Request a “Text File” then click “Submit Request”.

Below is an example on how to retrieve the refractive index data of aluminium (Al) for the energy range of $30\text{ eV} < E < 30,000\text{ eV}$ with 500 steps.



4. Wait until the refractive index data are shown and then click “CTRL+S” to save the text file. Make sure you save it as a .dat file with the format “sample.dat”, e.g. “Al.dat”. The .dat file consists of the real (“Delta”) and imaginary (“Beta”) refractive index component for each energy value.



5. Check your .dat file. Ensure you put it the same directory as RRE.ipynb notebook.

AI - Notepad

File Edit Format View Help

AI Density=2.699

Energy(eV), Delta, Beta

30.	0.107041024	0.00801586732
30.3512878	0.104060642	0.00793845672
30.7066898	0.101158664	0.00786180608
31.0662537	0.0983325094	0.00778590096
31.4300251	0.0955810845	0.00771071436
31.7980595	0.0929032117	0.00763624394
32.1704025	0.0903003588	0.00756252604
32.5471039	0.0877718404	0.00748361181
32.9282188	0.0853087232	0.0073914025
33.3137932	0.0829055756	0.00728065241
33.7038841	0.0805434436	0.00717152236
34.0985451	0.0782359168	0.00706404308
34.4978218	0.0759823546	0.0069581843
34.9017792	0.073780261	0.00685390132
35.310463	0.0716267377	0.00675119087
35.7239342	0.0695243031	0.00665001106
36.1422462	0.0674718916	0.00655034184
36.5654602	0.0654644817	0.00645218091
36.9936295	0.0635029748	0.00635549659
37.4268074	0.0615880489	0.00626025954
37.8650589	0.0597183481	0.00616644369
38.3084412	0.0578877553	0.0060740211
38.757019	0.0561003909	0.00598298386
39.2188498	0.0543554276	0.00589331286
39.6699944	0.0526496582	0.00580499554
40.1345139	0.050983496	0.00571800629
40.6044693	0.0493590049	0.00563049829
41.0799332	0.0477746129	0.00554084452
41.5609627	0.0462192968	0.00543777179
42.0476227	0.044691354	0.00533660874
42.5399857	0.0431941897	0.00523732509
43.0381088	0.0417275243	0.00513989199
43.5420685	0.0402849428	0.0050442731
44.0519333	0.038873367	0.00495043211
44.5677605	0.0374923088	0.00485833921
45.0896339	0.036137227	0.00476796133

Ln 1, Col 1100%Unix (LF)UTF-8

Additional notes:

- The energy values are given in a logarithmic scale. If you need a higher resolution, you can merge the refractive index data from different energy range inputs manually. Make sure that the first line of your .dat file is the density information and the second line is the columns label (“Energy(eV), Delta, Beta”).
- You may request a “Plot” instead of a “Text File” and use the provided refractive index plot to verify your own plot.