IDEADB – Innsbruck Dissociative Electron Attachment Database

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We present our recently established database containing numerical data on dissociative electron attachment (DEA) to molecules. Upon attachment of low energy electrons, molecules form transient negative ions, which may subsequently undergo spontaneous electron emission, decay into different fragment anions or stay as parent anions. Previously DEA has proven to be an important physical process in the investigation of radiation damage to biological tissue. In 2000, Sanche and coworkers showed that electrons with sub-ionization energies are able to induce strand breaks in DNA [1]. Those electrons potentially stem from higher energy particles and are created as secondary particles upon interaction of the primary particles with the tissue. Investigation of the effects of low energy electrons on biomolecules is therefore of great interest not only to understand radiation damage, but also to increase the precision of medical treatments like Ion Beam Cancer Therapy (IBCT).

Our database has been implemented using the reference implementation provided by VAMDC in Python with some minor additions. It mainly contains energy-dependent cross section values for different (bio-) molecules, but an addition to also include mass spectra is planned. It is currently compatible to VAMDC standards 11.12, but an update for 12.07 standards compatibility is underway.

To provide additional use to our group, a web interface for daily exchange of current measurement data between teams in our group has been developed. The system is designed to work together with our existing data evaluation based on Origin Pro.

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References

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