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Suppressing the fragmentation of fragile molecules in helium nanodroplets by co-embedding with water: Possible role of the electric dipole moment[1] YANFEI REN, VITALY KRESIN, University of Southern California — When fragile molecules are embedded in liquid helium nanodroplets, electron-impact ionization usually leads to fragmentation which is as extensive as for isolated gas-phase molecules. This occurs because of the energy release accompanying charge transfer from the impurity to the He^+ hole created by electron bombardment. However, in experiments with glycine, polyglycine peptide chains, and alkane hydrocarbon chains we found that if a few molecules of water are co-embedded with these molecules, the fragmentation of the latter is drastically reduced or completely eliminated. On the other hand, the fragmentation of alkanethiols remains unaffected. On the basis of these observations, it is proposed that the fragmentation "buffering" effect may correlate with the magnitude of the impurity's electric dipole moment, which steers the migration of the ionizing He^+hole through the droplet.

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