

Direct evidence of a strong isomer effect in electron-impact double ionization of C₃H₄

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Abstract

The electron-impact double ionization of two isomers of C₃H₄ (allene and propyne) between 25 and 1000 eV has been investigated using time-of-flight mass spectrometry. Unambiguous differences in the partial double-ionization spectra of these isomers are observed over the entire energy range. These isomer effects have been observed in C₃H₄ through the recording of target product channels and, in particular, when hard collisions involving the transfer of a large amount of energy is involved. Measurements of double-ionization events which fragment through Coulomb explosion are also reported. Coincidences between the charged fragment ions and protons were measured and shown to only exhibit isomer effects in the channel involving production of H⁺⁺CH₂⁺.

Indexed keywords

Coulomb explosion; Electron-impact double ionization; Time-of-flight mass spectrometry

Engineering controlled terms: Electron transitions; Ionization; Isomers; Mass spectrometry; Protons

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