Synthetic foldamers are non-natural polymers designed to fold into unique secondary structures that either mimic nature’s preferred secondary structures, or expand their possibilities. Among the most studied synthetic foldamers are $\beta$-peptides, which lengthen the distance between amide groups from the single substituted carbon spacer in $\alpha$-peptides by one ($\beta$) additional carbon. Cyclically constrained $\beta$-amino acids can impart rigidity to the secondary structure of oligomers by locking in a particular conformation. The $\beta$-residue cis-2-aminocyclohexanecarboxylic acid (cis-ACHC) is one such amino acid which has been shown to drive vastly different secondary structures as a function of the local conformation of the cyclohexane ring. We present data on two diastereomers of the mixed $\alpha/\beta$ tri-peptide Ac-Ala-$\beta_{ACHC}$-Ala-NHBn which differ from one another by the chirality along the ACHC residue (SRSS vs. SSRS). The first oligomer is known to crystallize to a 9/11 mixed helix while the second forms no intramolecular hydrogen bonds in the crystal state. This talk will describe the conformation-specific IR and UV spectroscopy of the above two diastereomers under jet cooled conditions in the gas phase. Assignments based on comparison with calculations show the presence of incipient 9/11 mixed helices and competing structures containing more tightly folded hydrogen-bonded networks. The calculated global minimum structures are observed in each case, and in each case these folded structures are reminiscent of a $\beta$-turn.