# ENHANCED ENANTIOMER-SELECTIVE POPULATION ENRICHMENT USING MICROWAVE SPECTROSCOPY WITH RAPID ADIABATIC PASSAGE

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Chirality is ubiquitous in nature since most biologically active molecules are chiral. The two mirror images of a chiral molecule, which are called enantiomers, have almost identical physical properties, however, their chemical and biochemical properties can differ tremendously. Thus, beyond the structural analysis, enantiomer differentiation and separation are essential for a deeper understanding of their functionality.

Over the past decade, microwave three-wave mixing has emerged as a chiral-sensitive technique enabling the differentiation of enantiomers using a sequence of microwave pulses.[1] This technique was further extended to achieve enantiomer-selective population transfer in chiral molecules, that is, the energetic separation of enantiomers in a specific rotational state of interest.[2−4] The efficiency of the enantiomer-selective population transfer is mainly limited by two factors: the spatial degeneracy and the thermal population of the rotational levels. To deal with the latter issue, we applied a chirped microwave pulse within the rapid adiabatic passage (RAP) regime to depopulate the initial thermal population in the relevant rotational state. The effect of the RAP pulse on the enantiomer-selective enrichment will be presented, in combination with a theoretical simulation.

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