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Preface

Spectroscopy is at the heart of a vast array of applications, including remote sensing in terrestrial and planetary atmospheres, fundamental laboratory spectroscopic studies, industrial process monitoring, and pollution regulatory studies. These activities can be implemented using transmission or radiance algorithms provided reference spectroscopic information is available. The HITRAN (High resolution TRANsmission) database is the recognized international standard compilation of spectroscopic reference data. The HITRAN compilation is constantly updated, with new information posted on the associated web site (<http://www.cfa.harvard.edu/HITRAN>). About every four years, these updates are integrated into a new edition of the compilation and documented in the open literature. As is customary since the 1990 edition of HITRAN, a Special Issue of the Journal of Quantitative Spectroscopy and Radiative Transfer is associated with the release of a new edition of the database. We continue this tradition with the release of the 2008 edition of HITRAN.

Maintaining a database such as HITRAN is a laborious, ongoing task requiring worldwide cooperation. To facilitate the process, an international advisory committee, composed of a dozen international experts in the field of spectroscopy, was established in 2004. Its main tasks are to review and evaluate new data, and to make recommendations for updates and replacements in the compilation. However, despite the tremendous amount of work involved in its maintenance, a database remains a compilation of existing data, which would not exist without the extensive work carried out in laboratories worldwide. These contributions, of primary importance, are certainly not to be forgotten. Those gathered in this Special Issue are a sample of the current state-of-the-art laboratory experimental and theoretical work. We were very pleased by the response received from our colleagues around the world to the announcement of this Special Issue.

Changing some of the content of a database approximately every four years instead of providing a definitive set of “high-accuracy” spectroscopic reference information (line positions, intensities, and broadening coefficients) may place a burden on some users. However, a database such as HITRAN is bound to evolve slowly, adding new molecules and replacing existing parameters with better accuracy information. This situation is the combined consequence of the difficulty in accurately measuring spectroscopic parameters, particularly for transitions involving higher-lying and/or interacting energy levels, and of the intimate link between these activities and technological progress and financial support. It is enhanced by the constant evolution of the capabilities of field experiments (especially satellite observations) and *in situ* observations. As already emphasized, the HITRAN database is the result of a continuous effort of many individuals and groups worldwide, each acting at a specific level. In this respect, the valuable contributions of Iouli Gordon, who helped in the preparation of this issue and of the new compilation, and Marie Šimečková, are gratefully acknowledged. We also owe our gratitude to the experts who gave much of their time and expertise in determining the scientific merit of the articles submitted to the Special Issue.

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