

Applicability of TDLAS gas detection technique to combustion control and emission monitoring under harsh environment

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20322855&lokasi=lokal>

Abstrak

Tunable diode laser absorption spectroscopy (TDLAS) has been well-known as an established detection technique for trace gas molecules and analytical instruments based on this technique are already commercially available. Practical applications to combustion control and emission monitoring for incinerators and industrial furnaces often involve considerations about the technique's capability to cope with such harsh measuring environmental conditions as high temperature, high pressure and high humidity. In this study, we theoretically describe the laser modulation spectroscopy technique and discuss practical applicability of the technique through a comparison between laboratory experimental results and theoretical calculations by the use of a molecular spectroscopic database, stressing on hydrogen chloride (HCl) measurement for exhaust gas of incinerators. Under experimental condition of elevated temperature, observed absorption line strength deduced by the second harmonic absorption spectrum of HCl in the first overtone region shows good agreement with theoretical prediction. This result indicates that variation of absorption signal due to temperature variation of flue gas can be compensated if gas temperature is simultaneously obtained.