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标题: Terahertz free-electron laser radiation to determine water concentration in flames
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摘要: The possibility of measuring the concentration of H2O molecules in flames based on the absorption of terahertz free-electron laser radiation was studied. These measurements were performed using the 177.32 cm(-1) absorption line in the rotational spectrum of H2O. This line has a low intensity at room temperature, and at about 1000 K, its intensity is comparable to that of the strongest lines. The temperature dependence of the radiation absorption coefficient at a frequency of 77.32 cm(-1) was studied theoretically and experimentally. It is shown that the method can be used for measurements in a sooty C2H4/O-2/Ar flame, which strongly scatters visible and UV radiation.
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