

## SPECTROSCOPY OF JUPITER'S ATMOSPHERE: INSIGHTS FROM DFT AND AB-INITIO CALCULATIONS

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Despite several space mission and astronomical observation made from earth, the structure, color and mode of formation of Jupiter planet and other Jovian planet remain largely unknown. Understanding the atmosphere, haze and the colors of these planets, especially the great red spot (GRS) of Jupiter and its belts are still a big challenge for both experimenters and theorists. Jupiter's colors range from blue to orange with some green regions. The most important chemical components that are responsible for the coloring of Jupiter and other Jovian planets are mainly CH<sub>4</sub>, NH<sub>4</sub>SH, H<sub>2</sub>O and NH<sub>3</sub> [1-3]. Although an explanation for the color of Jupiter have been suggested to involve these species or other related molecules arise from the interaction between these species in gas phase. In this report, we present our studies on the color of Jupiter. We have examined the electronic structure, stability infra-red and UV-Vis spectroscopy of NH<sub>4</sub>SH and other related molecules in crystalline and gas phase using Density Functional Theory (DFT) and ab-initio methods, are we report new insights from the spectroscopy NH<sub>4</sub>SH in explaining the different color regions of Jupiter.

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