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Investigation of A-X band system of astrophysically significant molecule BS(Article)([Open Access](#))

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Abstract

It is widely known that molecular signatures in celestial object play a vital role in deriving the physical conditions of the object using spectroscopic technique. The present study therefore focuses on the evaluation of Franck-Condon factors (FCFs) and r-centroids for the A-X band system of Boron mono-sulphide (BS) molecule by a numerical integration method using the suitable potential. With the help of FCFs and r-centroids, the vibrational temperature of the source is estimated and is found to be about 6893 K. The vibrational temperature estimated in the present study reveals that the rotational temperature of the molecule has to be considered for the identification of the chosen band system in the astrophysical spectra. The vibration rotation interaction (VRI) effect for the chosen band system is discussed. It is found that the VRI effect may influence the effective temperature of the source and hence the effect of VRI has to be considered at the time of identifying the BS molecular lines in the spectra of sunspot or any celestial object. © Penerbit Universiti Sains Malaysia, 2018.

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BS molecule [Franck-Condon factors](#) [R-centroids](#) [Sunspot](#) [Vibrational temperature](#)

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