**Abstract: -**

Raman spectra from sodium halides and clean water solutions are found off the OH elongating (2500–4000 cm-1) Five Gaussian constituents of the Raman outlines are deconvoluted whose middle frequencies are 3628, 3051, 3511, 3393, and 3233cm-1. The resemblances and variances of the properties of sodium halides and temperature on the structure of hydrogen bond water are exposed plainly by the Raman spectra and by its deconvolutions. Alike temperature, the whole of the sodium halides breakdown the tetrahedral structure of the water, and the Gaussian factor of 3233 cm-1 reductions, and the factor of 3393 and 3511 cm-1 rise mostly. The variances remain in their properties on the factor 3628 and 3051 cm-1. The tetrahedral structure of water is disrupted by all of the halogenic ions and their disrupting activities are in the increasing order of F-1 < Cl-1 < Br-1 < I-1. The motive is relative to the strong point of water-water hydrogen and halogenic ion–water bonds.

**Introduction: -**

The maximum abundant, Water, and typical fluid on the earth, it has several unique properties that act an important role in chemical and biological reactions. All of the rare properties associated with water structure, which have been analyzed in theory and tested broadly [1]. Though, aspects of water structure remain undefined. Liquid water seems to keep tetrahedral hydrogen-bonded structures similar to the structure of ice. Ions and temperature are two normal factors that affect the water structure. Usually, the water structure is cracked with rising temperatures. Ions may have parallel worrying results to the temperature on water structure, and even the idea of ‘structure temperature’, which describes the temperature at which clean water would have the identical properties as those of a certain solution, was used [2]. The ion’s effect on the structure of water is ion-specific. Halogenic ions have performed a significant part in opening out the properties of anions on the structure of water [3]. It is essential to study the connections of halogenic ions and water molecules and to express separately their properties on water structure in the description.

We will discuss the Raman spectra related to all these things.

**Result and Discussion: -**

Raman spectrum Temperature dependence of pure water: -

It has been shown in the figure, the OH extends (2500–4000 cm-1). The temperature range of Raman spectra of pure water is 273–373 K. It can be viewed from the Raman spectra of water that the maximum peak happens near 3420 cm-1, a strong shoulder happens near 3230 cm-1, and a weak shoulder is apparent near 3620 cm-1. With the increase in temperature, the location of the highest peak changes to high wavenumber, and the strength of the strong shoulder reductions and the weak shoulder growths. The frequency of the elongate OH vibrations is the consequence of shared effects, and an alteration of the temperature will result in spectral shifts of the dissimilar kinds of water molecules. Though the Raman spectra do not shift considerably more in the temperature choice of 273–373 K, and the stretching of OH Gaussian constituent central frequencies are comparatively self-determining of temperature [4]. It is sensible to decay the spectrum of the stretch of OH sensations with the five Gaussians of the water molecule that are allocated to specific kinds of water molecules, and the dominant frequencies remain the same in this study.

100

80

343

60

373

40

20

3900

3300

2500

It has been shown in fig 2 deconvolution of the Raman spectrum of unpolluted water at 273 K and the Raman spectra of unpolluted water at further temperatures are deconvoluted in a similar way.

3300

3900

2700

Fig 2: Raman spectra of water and its five Gaussian fits.

In Fig 3 expressions the percent of the combined strength of each constituent in the whole combined intensity of the spectrum as a purpose of temperature.

From Fig. 3, concentrations of the constituents of 3051 and 3233 cm-1 reduce, and the concentration of constituents of 3393, 3511, and 3628 cm-1 rises with growing temperature. Typically, tetrahedral structures of water disruption and somewhat hydrogen-bonded structures of water are improved with rising temperatures. It might be realized that the constituents of 3051 and 3233 cm-1 are allocated to an entirely four-hydrogen attached water structure. The former is maybe allocated to intermolecularly joined ν1 vibrations shifting in point with one another and the latter is allocated to the shared in phase O–H elongating vibrations of hydrogen-bonded collections containing a dominant water molecule and its adjacent and higher neighbors [29]. Constitution of 3393, 3511, and 3628 cmK1 could be assigned to partly hydrogen-bonded water structures. There is a disagreement with other studies in the assignment of the component of 3393 cmK1. Usually, component near 3400 cmK1 such as component 3393 or 3415 cmK1 is assigned to a fully four-hydrogen bonded water structure [1,30]. The addition of ions has similar effects on the Raman spectrum of water to the change of temperature. Many other types of research decomposed the OH stretch Raman spectra of water with Gaussians, and their central frequencies remain the same in studying the effects of ions on water structure [18,34]. In the following study, the Raman spectra of water with the addition of sodium halide are also deconvoluted in the same way.

**Reference: -**

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4. D.M. Carey, G.M. Korenowski, J. Chem. Phys. 108 (1998) 2669–2675.