Raman spectroscopy rapidly develops in recent years. Nowadays, it is widely used in industry and science. However, its potential has not been fully exploited in mineralogy. This method allows us to determine water molecules, hydroxyl, OH^-, and carbonate, $(CO_3)^{2-}$, groups, whose presence confirmation is troublesome by other methods. Raman spectroscopy is classified as a structural method and can also provide information about molecules' symmetry building an investigated mineral. Raman spectra depend on chemical composition, structure type, pressure and temperature of experiments, and crystal orientation regarding laser beam polarization. Different numbers, positions, and intensities of bands characterize Raman spectra. This makes them difficult to interpret. In mineralogy, Raman spectroscopy is mainly used for mineral identification, and polarization studies are rarely performed. On the other hand, single-crystal X-Ray diffraction methods are commonly used in the research of mineral structures. This project aims to show the complementarity of Raman spectroscopy and X-Ray diffraction and the advantages of using polarized Raman measurements. The planned study is intended to investigate hydrated minerals with microporous structure – zeolites and layered structure – lamellar double hydroxides. It is worth highlighting that these phases are commonly used in industry: zeolites as a molecular sieve and lamellar double hydroxides are one of the concrete components contributing to its strength. The combined methods mentioned above will allow for the precise assignment of spectral bands to structural units and the determination of the order of water molecules, hydroxyl groups, and hydrogen bonds, which are crucial for the strength of layered structures. Additionally, temperature experiments are planned, which will provide information on structural changes and corresponding Raman spectra modification. Additionally, temperature experiments are planned to provide information on structural changes with increasing temperature and corresponding Raman spectra modification. A proposed approach involving a combination of spectroscopic methods and diffraction, as well as temperature experiments, is innovative for the scientific discipline of Earth and Environmental Sciences and sets a new approach in the study of minerals.