Raman spectroscopy and XRD analyses for the identification of some natural minerals from Midelt-region, Morocco

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This work presents the results of identification and characterization by Raman spectroscopy and XRD, of five natural minerals collected from Midelt region specially Mibladen, Morocco. Analyses were carried out on samples referenced VULM, CERM, VANM, GROM, and GALM. The results show that Raman spectrum of VULM sample exhibit a strong band at 871 cm⁻¹, the fingerprint of wulfenite mineral (PbMoO₄), and which can be assigned to the ν₁-symmetric stretching of MoO₄²⁻ group [1, 6]. The CERM Raman spectrum shows a strong band of carbonate (ν₁) located at 1054 cm⁻¹ and weak bands around 835 cm⁻¹ and 145 cm⁻¹ which can be attributed to cerussite mineral [2]. The Raman fingerprint of vanadinite mineral located at 828 cm⁻¹ associated to ν₁-symmetric stretching of VO₄³⁻ ion [3], was highlighted in the VANM spectrum. The spectrum of GROM sample displays bands located at 558 cm⁻¹ and 625 cm⁻¹, characteristics of stretching modes in groutite mineral (Mn³⁺O(OH)), [4]. The Raman bands identified in the spectrum of GALM sample are attributed to galena mineral [5]. The results obtained by the Raman spectroscopy agree well with the XRD of the samples.

Figure 1: (A) Photography of the samples, (B) and (C) are the XRD and Raman spectrum of the VULM sample, respectively. Ref in figures indicates reference spectrum.