

## IR SPECTROSCOPY OF METALLO-FULLERENES: POTENTIAL ASTRONOMICAL PRESENCE?

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Efforts over 40 years still leave the source of astronomical infrared emission bands largely unidentified. We report the first laboratory infrared (6–25  $\mu\text{m}$ ) spectra of gas-phase fullerene-metal complexes,  $[\text{C}_{60}\text{-Metal}]^+$  (Metal = Fe, V), and show with density functional theory calculations that complexes of  $\text{C}_{60}$  with cosmically abundant metals, including Li, Na, K, Mg, Ca, Al, V, Fe, all have similar spectral patterns. Comparison with observational infrared spectra from several fullerene-rich planetary nebulae demonstrates a strong positive linear cross-correlation. The infrared features of  $[\text{C}_{60}\text{-Metal}]^+$  coincide with four bands attributed earlier to neutral  $\text{C}_{60}$  bands, and in addition also with several to date unexplained bands.