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Novel Properties of Diamondoid Molecules WILLIAM CLAY, ZHI LIU, WANLI YANG COLLABORATION, ZHI-XUN SHEN COLLABORATION, NICK MELOSH COLLABORATION, JEREMY DAHL COLLABORATION, ROBERT CARLSON COLLABORATION — The recent isolation of a number of diamond-like hydrocarbons molecules (diamondoids) has sparked renewed interest in these unusual molecular systems. Several unique properties of these molecules are investigated. Diamondoid monolayers have been found to profoundly alter the electron emission tail of metal substrates in recent photoemission experiments, producing a sharp, nearly monochromatic peak. It is postulated that the cause of this effect is negative electron affinity combined with a strong electron-phonon interaction. New data and simulation results are presented to support this theory. Additionally, photoluminescence spectra for a number of diamondoid crystals are presented, taken with a 229 nm laser. To our knowledge, this is the first observation of UV photoluminescence in a saturated hydrocarbon molecule. Possible explanations for this phenomenon are discussed.

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