

Inorganic nanotubes: From WS₂ to "misfit" compounds

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Update on the synthesis and characterization of new inorganic nanotubes from 2D compounds, like W(S,Se)₂ [1] will be given. The strong coupling between optical cavity modes confined in the nanotube and the excitonic transitions have been studied in some detail [1,2]. Virtually recently, an “artificial recording eye” combining vision, storage and writing power has been established by a 4x4 array of WS₂ nanotubes. [3] Recent progress in mechanically reinforcing different polymers, will be briefly discussed. Different nanotubes from quaternary “misfit” layered compounds (MLC) have been realized in recent years. In one recent case, the strong chemical affinity of the RE atoms towards sulfur atoms and that of selenium towards the tantalum atoms, led to the synthesis of highly anisotropic nanotubes, like RESe-TaSe₂ and RE-(TaSe₂)₂ (with RE=La, Sm) with extremely large (local) dipole moment. [4] Such nanotubes offer unique behavior, like 1D superconductivity, etc., suitable for quantum technologies. Generally speaking, nanotubes like any other nanoparticles, are a metastable phase. The mechanism of nanotubes decomposition at elevated temperatures will be discussed in brief.

References

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