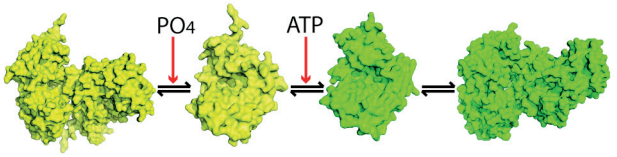
interactions for Rio1 in the presence of adenosine, toyocamycin and ATP revealed interactions between monomers that suggest Rio1 can have two dimeric forms, one observed in the presence of adenosine, and the other seen when bound to ATP and toyocamycin. In addition, since these are both asymmetric, open, dimeric forms, these states have the potential to bind other monomers or dimers to form trimers or tetramers. The dimer formed in the presence of toyocamycin and ATP results in complete occlusion of one active site, consistent with the observation of inhibition by toyocamycin and high concentrations of ATP. Thus, we show that Rio1 activity is influenced by oligomer formation, which is modulated by autophosphorylation and binding to ATP and toyocamycin.



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Keywords: kinase, ribosome biogenesis, oligomer

MS.52.1

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Molecular confinement inside carbon nanostructures: a playground for molecular dynamics investigations

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In this contribution I will present several recent results on the dynamics of a selection of molecules confined inside different nanocarbon hosts: fullerene C_{60} and carbon nanotubes. The results are essentially derived from a large panel of inelastic neutron scattering investigations at different time/energy scales.

In the first part, I will illustrate the effect of confining a quantum system by presenting the results obtained on molecular H_2 confined inside C_{60}[1,2] cages. I'll show how the energy diagram of a free H_2 molecule is affected by the coupling of its translational and rotational degrees of freedom under confinement.

In a second part I will come back to classical physics and will focus on the effect of interstitial insertion of a cubic like molecule C_8H_8 (further referred as "cubane") on the dynamic of the C_{60} lattice. We will see that the cubane molecules act as molecular spacers, resulting in lubrication of the fullerene rotations[3].

In the third part, I will focus on the dynamics of fullerene molecules being the guest molecules when confined onto a 1D lattice inside single walled carbon nanotubes[4], a guest-host molecular system referred as "carbon peapods". The specific spectral signature of the dynamics will be discussed in term of both confinement and low dimensionality.

Keywords: fullerene, neutron_scattering, vibrational

MS.52.2

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Atomic structure of graphitic materials visualized by using TEM and STEM

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Edge structures and atomic defects can significantly affect the physical and chemical properties of low-dimensional materials, such as nanoribbons, and therefore, merit a thorough investigation at the atomic scale. In this study, edge structures of thermally treated graphite have been studied by means of atomically resolved high-resolution transmission electron microscopy (HRTEM). The method for determination of monolayer or more than one layer graphene sheets is established. A series of tilting experiment proves that the zigzag and armchair edges are mostly "closed" between adjacent graphene layers [1]. Besides graphene sheets, the edge structure of monolayered WS_2 nanoribbon has also been investigated by time-resolved annular dark-field imaging (ADF) (as shown in the figure) and spatially resolved electron energy-loss spectroscopy (EELS) with a scanning transmission electron microscope (STEM). Atomic defects, such as vacancies and edge atoms, were unambiguously identified and successfully visualised in motion. We also report a direct observation of slip deformation in the WS_2 nanoribbons and present evidence demonstrating that the deformation process involves the migration of vacancies and rearrangement of W atoms. Single-atom defects were successfully observed for the first time during plastic deformation [2].

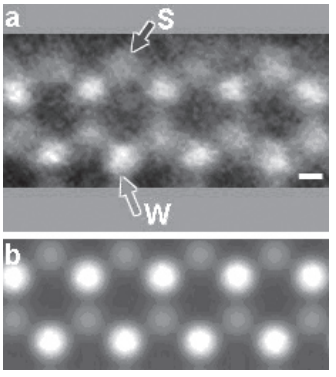

Figure (a) STEM ADF image of a monolayered WS_2 nanoribbon encapsulated inside a SWNT taken in the [001] direction. Scale bar = 0.1nm. (b) The corresponding simulated image.

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Keywords: atomic structure, HRTEM, STEM

MS.52.3

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The physics of nano-carbons explored by high-resolution transmission electron microscopy

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Graphene is a crystalline single layer of carbon atoms that can be described as an individual atomic plane extracted from graphite. It is an outstanding new material that promises a wide range of new