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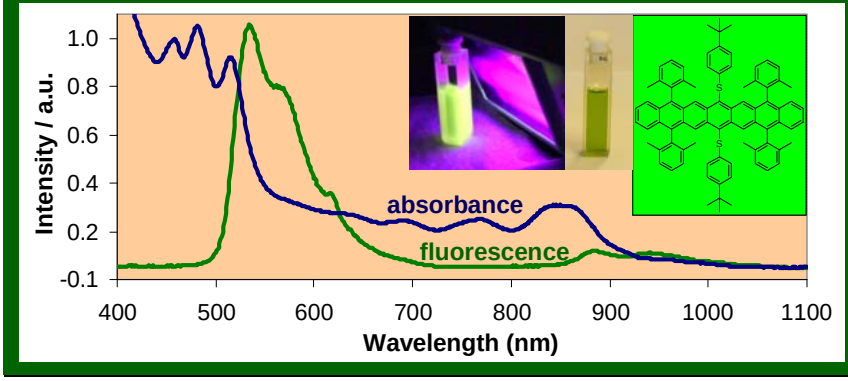

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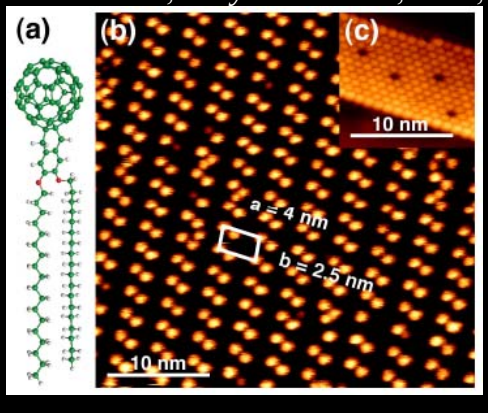

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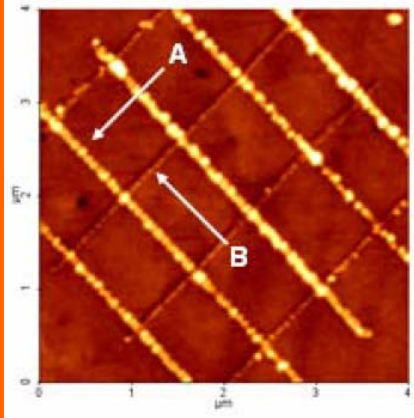

Figure 5. (Color online) Field–assisted nanopatterning of criss-crossing, heterogeneous nanolines composed of [60]fullerene (A) and $MgCl_2$ (B) on ODT–coated Au(111). Both lines were patterned using a tip bias of -10 V and a fabrication

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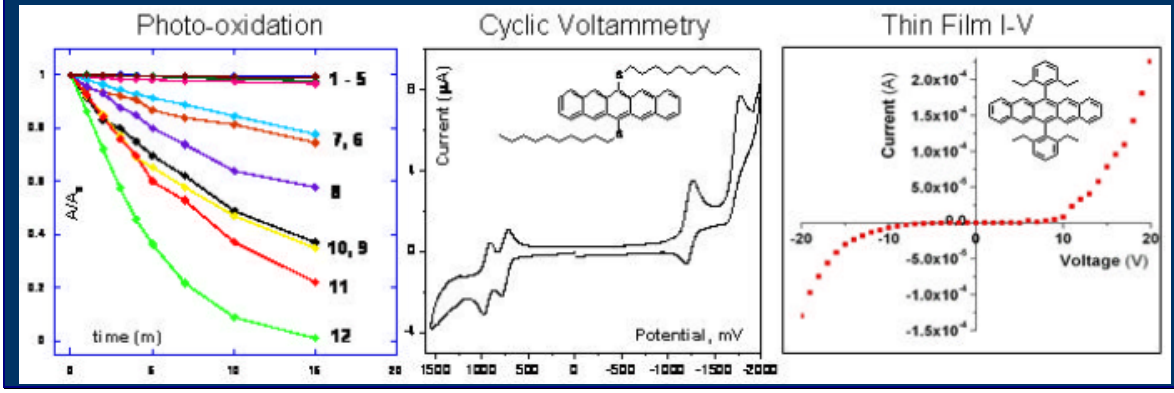

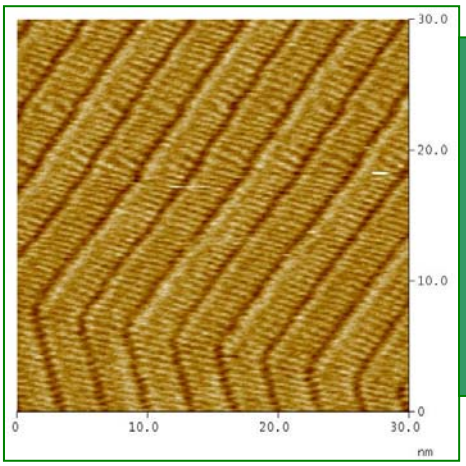

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Left: An STM image showing ordered structures of docosanol molecules on an HOPG surface 18 minutes after deposition of a docosanol-phenyloctane solution

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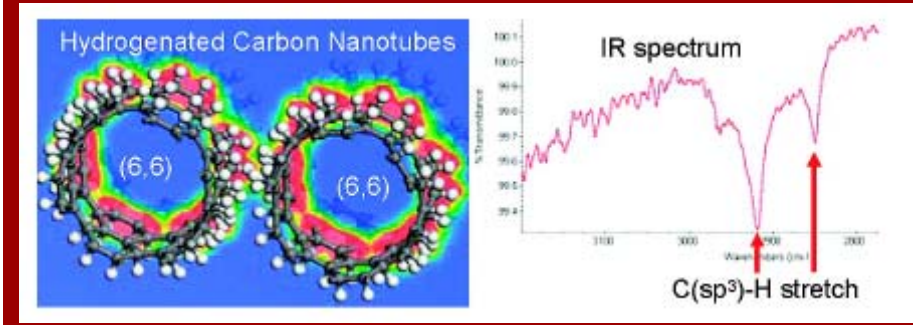

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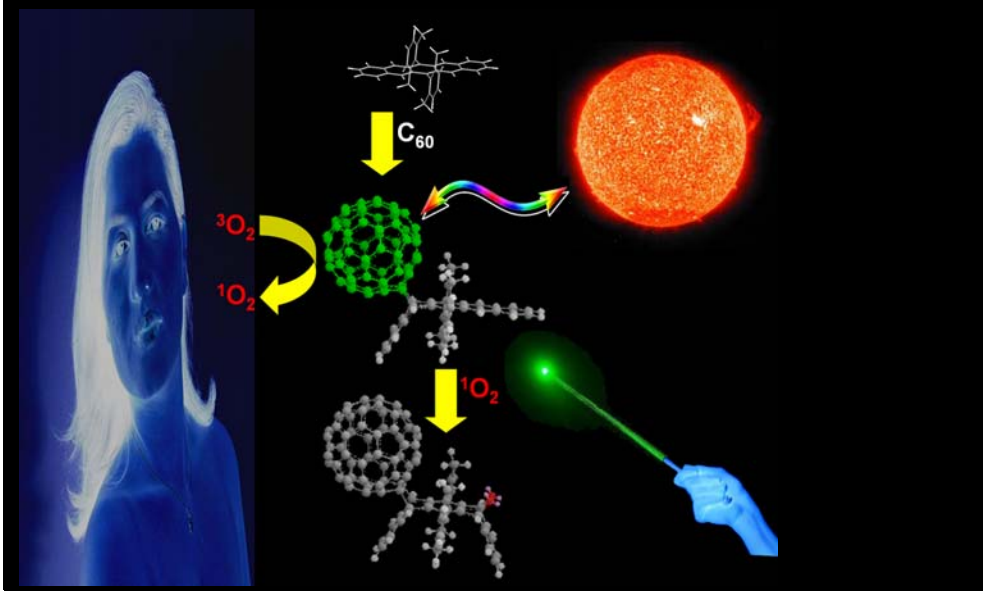

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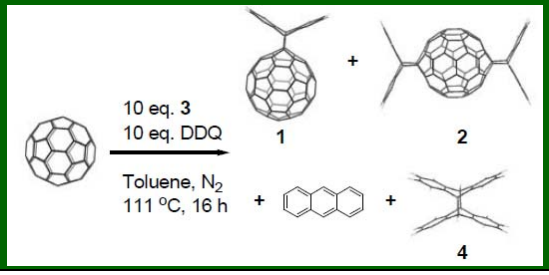

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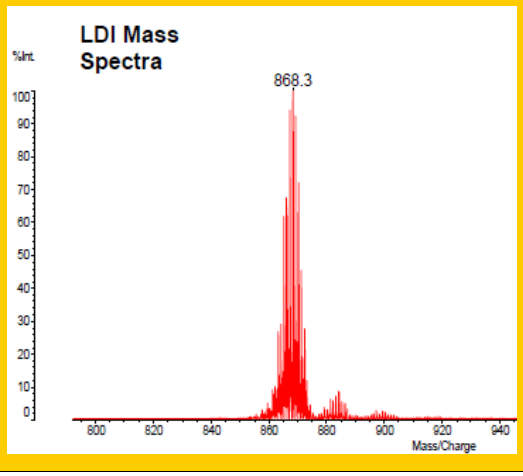

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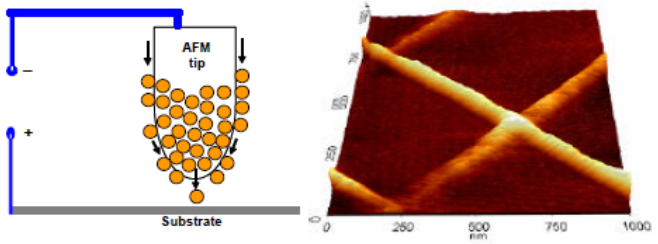

A new SPM based lithography method called field-assisted nanopatterning (FAN) is demonstrated. Using a conventional AFM with no alterations, FAN controllably patterns solids or liquids, organics or inorganics, in air under ambient conditions. Both 2D and 3D patterns are produced with feature sizes that range from microns to sub-20 nm. Examples include the high-resolution FAN of [60]fullerene, N-methylpyrrole, naphthalene, poly-3-octylthiophene, polyaniline, gold, iron oxide and zinc oxide. These molecules have been patterned onto HOPG, ITO, Au and passivated Au. Patterning is turned on or off by controlling tip bias and the same tip is used for both patterning and imaging.

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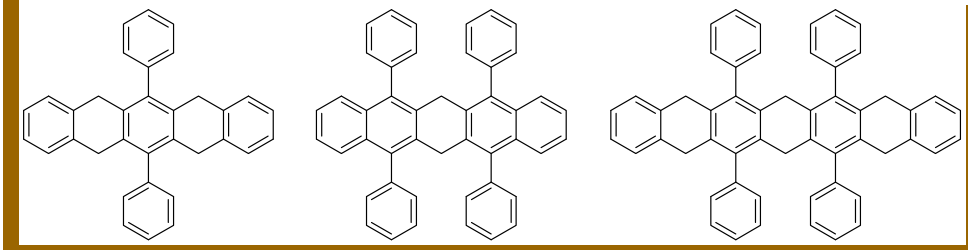
The first systematic study concerning the hydrogenation of acenes and acene quinones is presented. Phenyl substituted acenes and acene quinones are hydrogenated in excellent yield and with complete regioselectivity using HI–AcOH. The resulting H-protected acenes bear alternating aromatic and non-aromatic rings and are stable, soluble molecules that may be stored indefinitely and then deprotected to afford the parent acenes. In this manner, H-protected acenes have been utilized in the syntheses of several [60]fullerene-acene adducts. Buckminsterfullerene also hydrogenates in HI–AcOH yielding C_{3v} symmetric $C_{60}H_{18}$.



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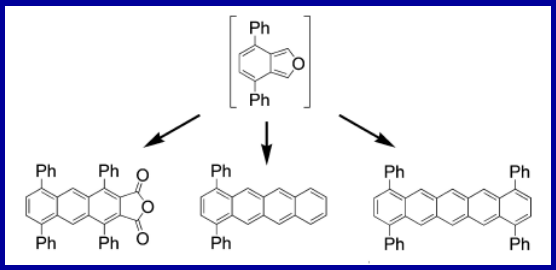

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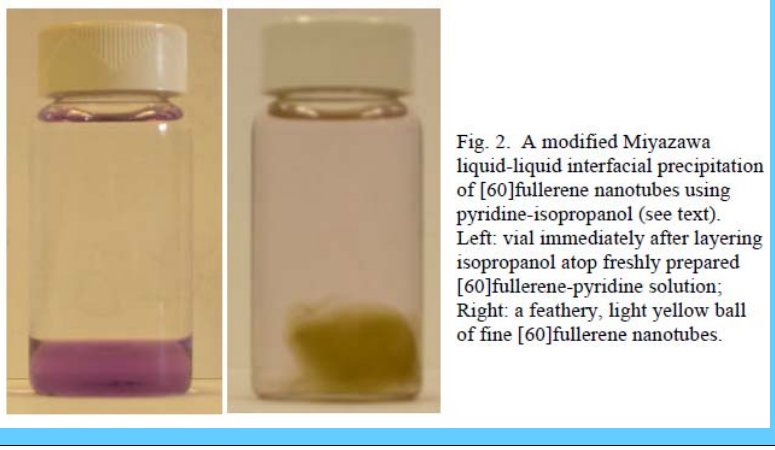

Fig. 2. A modified Miyazawa liquid-liquid interfacial precipitation of [60]fullerene nanotubes using pyridine-isopropanol (see text). Left: vial immediately after layering isopropanol atop freshly prepared [60]fullerene-pyridine solution; Right: a feathery, light yellow ball of fine [60]fullerene nanotubes.

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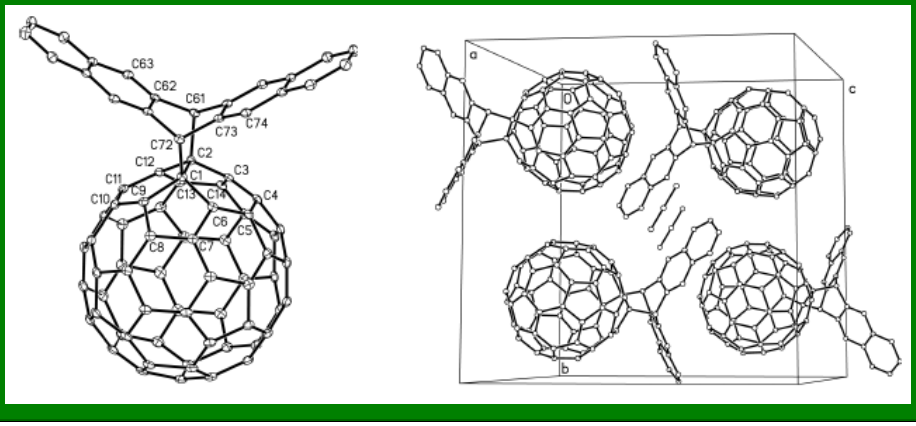

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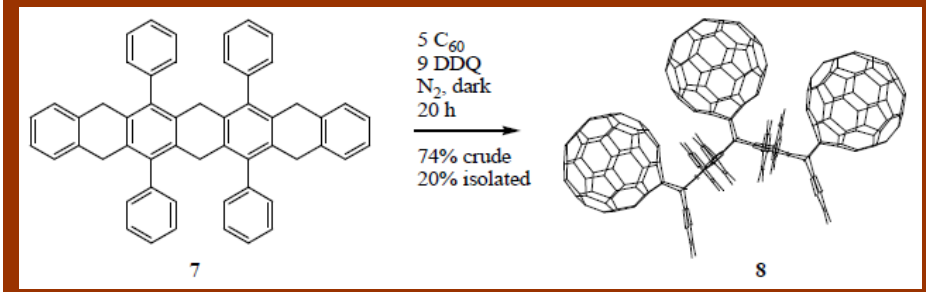

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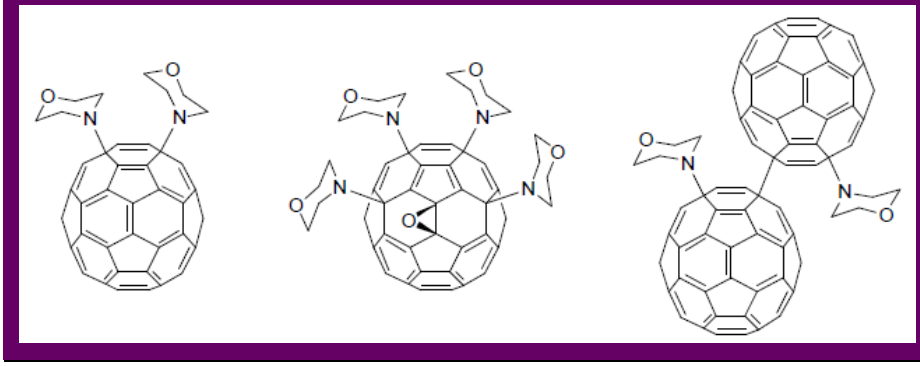

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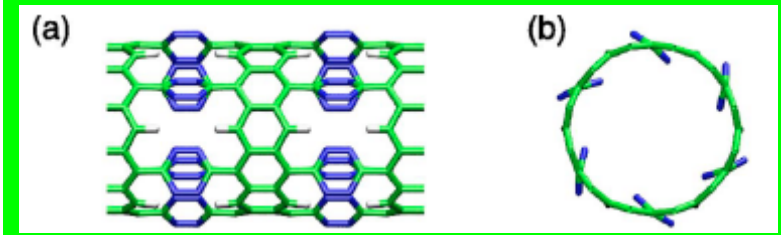

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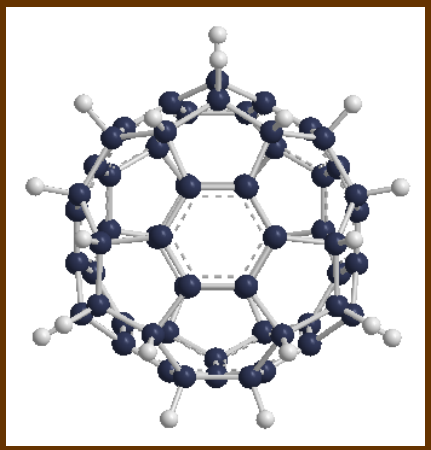

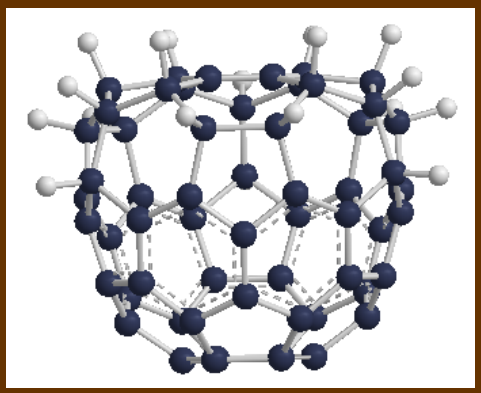

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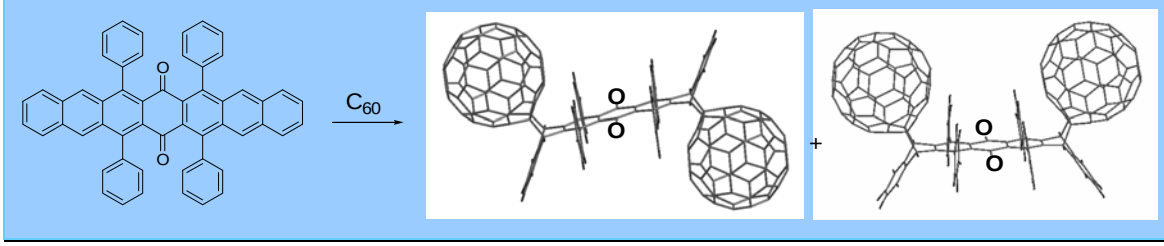

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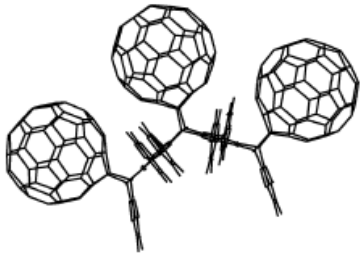

A one-pot, diastereoselective synthesis of a *cis,cis*-tris[60]fullerene adduct of 6,8,15,17-tetraphenylheptacene has been demonstrated starting from [60]fullerene and 5,7,9,14,16,18-hexahydro-6,8,15,17-tetraphenylheptacene.

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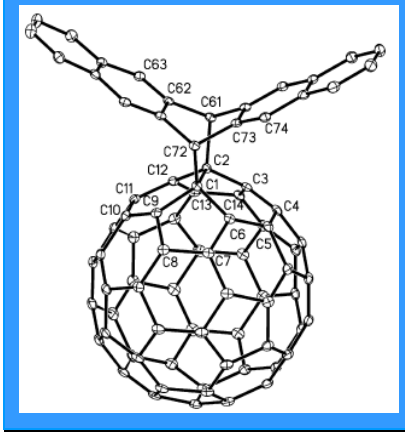

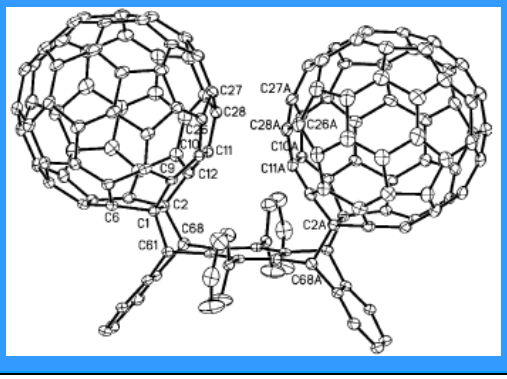

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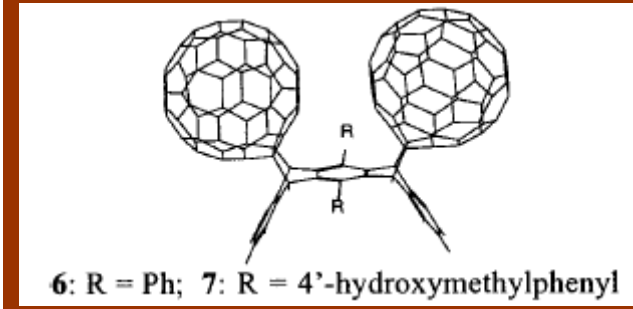

6: R = Ph; **7**: R = 4'-hydroxymethylphenyl

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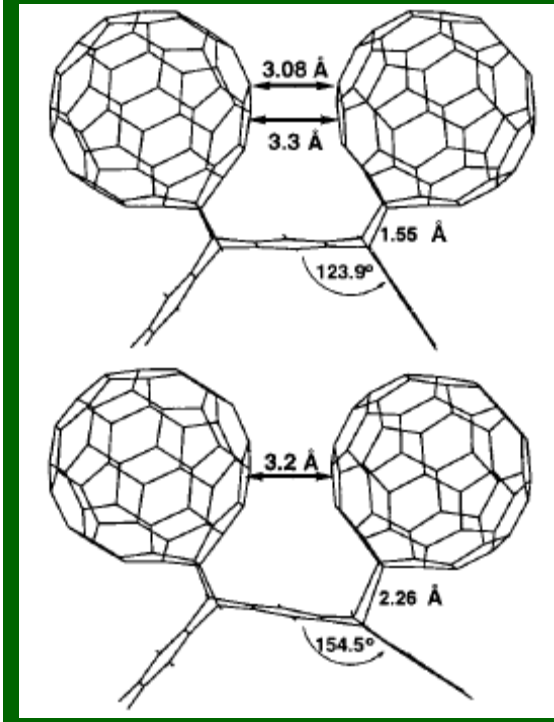

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