

NOBELOVO NAGRADO ZA KEMIJO 2011 JE PREJEL DANNY SHECHTMAN ZA ODKRITJE KVAZIKRISTALOV

JANEZ DOLINŠEK

Institut Jožef Stefan,
Fakulteta za matematiko in fiziko, Univerza v Ljubljani in
Center odličnosti EN FIST

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Kvazikristali so snovi, v katerih obstaja nov red dolgega dosega brez translacijske simetrije. Njihove simetrije vsebujejo kristalografsko „prepovedane“ elemente, kot so 5-, 8- 10- in 12-števna rotacijska os. Kvazikristali so zlitine kovinskih elementov (Al-Pd-Mn, Al-Cu-Fe, Al-Ni-Co, Tb-Mg-Zn, itd.), kvaziperiodične simetrije pa najdemo tudi v samoorganizirani mehki snovi. Visokokvalitetni kvazikristali imajo veliko električno upornost in majhno toplotno prevodnost, nekateri so trši od jekel, kemijsko nereaktivni (ne korodirajo) in imajo majhen količnik trenja. V njih je možno uskladiščiti velike količine vodika. Za odkritje kvazikristalov je izraelski znanstvenik Danny Shechtman prejel Nobelovo nagrado 2011 za kemijo. Shechtmanovo odkritje kvazikristalov ima zanimivo in poučno zgodovino, ki kaže, kako težko je prodreti s popolnoma novimi spoznanji v mednarodno strokovno javnost.

NOBEL PRIZE 2011 FOR CHEMISTRY WAS AWARDED TO DANNY SHECHTMAN FOR THE DISCOVERY OF QUASICRYSTALS

Quasicrystals are materials having a new type of perfect long-range order without translational periodicity. Their symmetries (icosahedral, dodecagonal, decagonal, octagonal, and pentagonal) involve symmetry elements such as 5-, 8-, 10- and 12-fold rotation axes, which are incompatible with the periodicity of a Bravais lattice. A consequence of nonperiodicity is that quasicrystals – alloys of metallic elements (Al-Pd-Mn, Al-Cu-Fe, Al-Ni-Co, Tb-Mg-Zn, etc.) – exhibit more semimetallic to insulating-like properties. Their favourable physical and mechanical properties – high hardness, resistance to corrosion and wear, low friction coefficient, low electrical and thermal conductivity, superplasticity at elevated temperatures, ability to store large amounts of hydrogen – make quasicrystals interesting new materials for the technological application. Quasiperiodic symmetries are observed also in self-organized soft matter. The Nobel prize 2011 for chemistry was awarded to Israeli scientist Danny Shechtman for the discovery of quasicrystals. This discovery has interesting history, showing the difficulties of accepting a new breakthrough discovery in the scientific society.

Uvod

Nobelovo nagrado za kemijo 2011 je prejel izraelski znanstvenik Danny Shechtman (slika 1) z Izraelskega instituta za tehnologijo Technion v Haifi za