

Laboratory	Research Project Samples
Organic Chemistry Laboratory	Synthesis of cycloparaphenylene: a carbon nanoring Rapid synthesis of new pharmaceutical candidates by C-H coupling C-H coupling of polycyclic aromatic hydrocarbons for nanographene synthesis Nickel-catalyzed C-H coupling: Synthesis of bio-molecules and mechanism Synthesis of carbon nanobelt
Functional Organic Materials Laboratory	Electronic and structural modification of pi-electron systems employing main group elements
Organic Synthesis Group	
Noyori Laboratory	
Biochemistry Laboratory	Studies on protein transport pathways in mitochondria Studies on protein quality control in the ER
Nano-Structured Materials Laboratory	Synthesis, characterization and applications of length sorted DNA-wrapped carbon nanotube UHV-STM/STS studies on the polymerization of metallofullerenes and the band structures of metallofullerene Fabrication and characterization of novel one-dimensional materials inside carbon nanotubes
Photo-Physical Chemistry Laboratory	Ultrafast reaction imaging by ultrashort few-cycle intense laser pulses Generation of laser high-order harmonics for attosecond pump-probe spectroscopy Coherent control of bimolecular reactions using laser-induced filaments
Quantum Chemistry Group	Development of the density-functional tight-binding method and its application in computational nanomaterial Density-functional tight-binding molecular dynamics simulation of the self-capping process in open-ended zigzag and chiral SWCNTs Density functional theory study of reaction mechanism pathways for Rh(I)-catalyzed aldol-type reactions of QM/MD simulation of graphene hole repair by C <sub>2</sub> molecules The molecular structure and vibrational spectroscopy of hydroxylated nanodiamonds Theoretical study of electronically excited states with external effects
Advanced Materials Laboratory	
Molecular Architecture Laboratory	Programmable assembly of metal complexes in porphyrin/phthalocyanine four-fold rotaxane Nanoporous liquid crystals consisted of macrocyclic metal complexes
Inorganic Chemistry Laboratory	
Bioinorganic Chemistry Laboratory	Functionalization of proteins by complexation with metal complexes Construction of novel biocatalysts utilizing the substrate misrecognition of cytochrome P450B5β induced by decoy Rational engineering of <i>Thermus thermophilus</i> cytochrome c552 to a thermally tolerant artificial peroxidase Construction of ferritin cage encapsulation metal complexes with catalytic activities Challenging oxidation reactions using the substrate misrecognition of cytochrome P450BM3 Study on the heme acquisition system A from <i>Pseudomonas aeruginosa</i> and its functionalization
Physical Inorganic Chemistry Group	Isolation, Structural and Electrochemical Analyses of Cu(I) Complexes with Bidentate 1,1-Diphenyl-1-phospha-4-thiapentane (mtdpp) and Quadridentate 5,9-Diphenyl-5,9-diphospha-2,12-dithiatridecane (2,3,2-SPPS): Monomeric [Cu(mtdpp)] <sub>2</sub> BF <sub>4</sub> and Dimeric [Cu <sub>2</sub> (2,3,2-SPPS) <sub>2</sub> ](BF <sub>4</sub> ) <sub>2</sub> Complexes (L = 6,6'-dimethyl-2,2'-bipyridine or 2,9-dimethyl-1,10-phenanthroline): A Completely Gated Reduction Reaction of [Cu(dmp) <sub>2</sub> ] <sup>2+</sup> in Nitromethane. Syntheses, Structural Determinations of [Ru(ROCS <sub>2</sub> ) <sub>2</sub> (PPh <sub>3</sub> ) <sub>2</sub> ]+/0 Couples, and Kinetic Analyses of Thermal Isomerization Reactions Involving Transient trans-[Ru(iPROCS <sub>2</sub> ) <sub>2</sub> (PPh <sub>3</sub> ) <sub>2</sub> ] Species (ROCS <sub>2</sub> = Ethyl- or Isopropylidithiocarbonate and PPh <sub>3</sub> = Kinetic Study of Thermal Z to E Isomerization Reactions of Azobenzene and 4-Dimethylamino-4'-nitroazobenzene in Ionic Liquids, 1-R-3-methylimidazolium Bis(trifluoromethylsulfonfyl)imide (R = butyl, pentyl, and hexyl)).