



University of Zagreb
Faculty of Chemical Engineering
and Technology



Integrated battery development at the Faculty of Chemical Engineering and Technology, University of Zagreb



Zoran Mandić



University of Zagreb
Faculty of Chemical Engineering
and Technology



Education and science

Leading Faculty of Chemical Engineering in Croatia (aprox. 200 employees)

Recognized as an institution of knowledge, excellence, interdisciplinary research and tradition



Education – aprox. 1100 students

UniZg – aprox. 65000 students

Science - among top research institutions in Croatia



50+

International projects
(H2020, FP7, FP6, UKF,
EUREKA, bilateral projects)

100+

National projects
(HRZZ, MZO, HAMAG-BICRO)



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Technology transfer

Active in promotion of chemical engineering and chemistry and positive impact on society

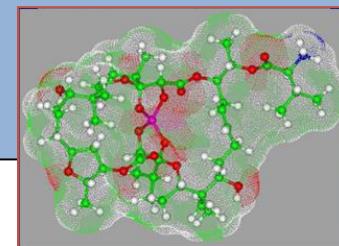
Significant impact on industrial development in region

Supports entrepreneurship (spin off)



200+

Projects with industrial
and public sector



„Comprehensive water technology“ – tvrtka kćer....



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Neophodne discipline u razvoju baterija

Primijenjena
kemija

Elektrokemijsko
inženjerstvo

Inženjerstvo
materijala

Procesno
inženjerstvo





Priprava novih materijala i njihovih kompozita

Materijali visokog sadržaja energije

Visoko-naponske katode

„Self-healing“ polimerni materijali

Membrane

Procesiranje i obrada materijala

Nanotehnologija

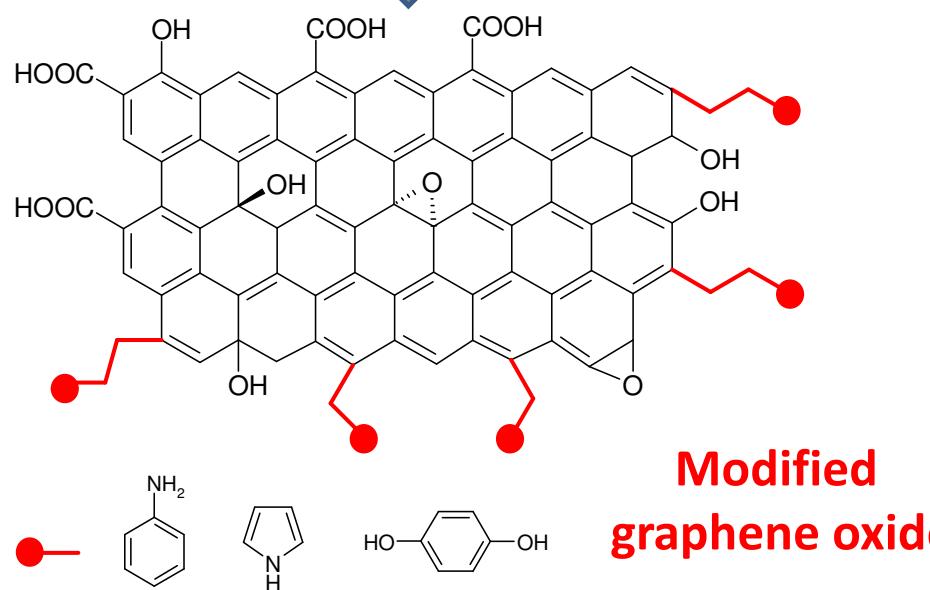
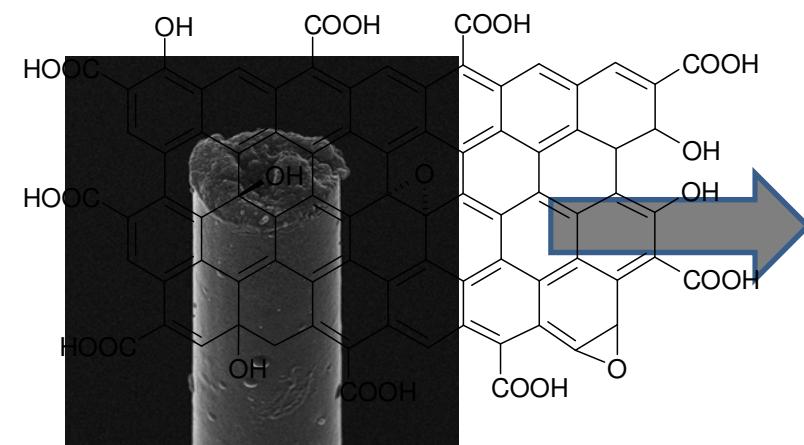
Površinska obrada

Senzorika

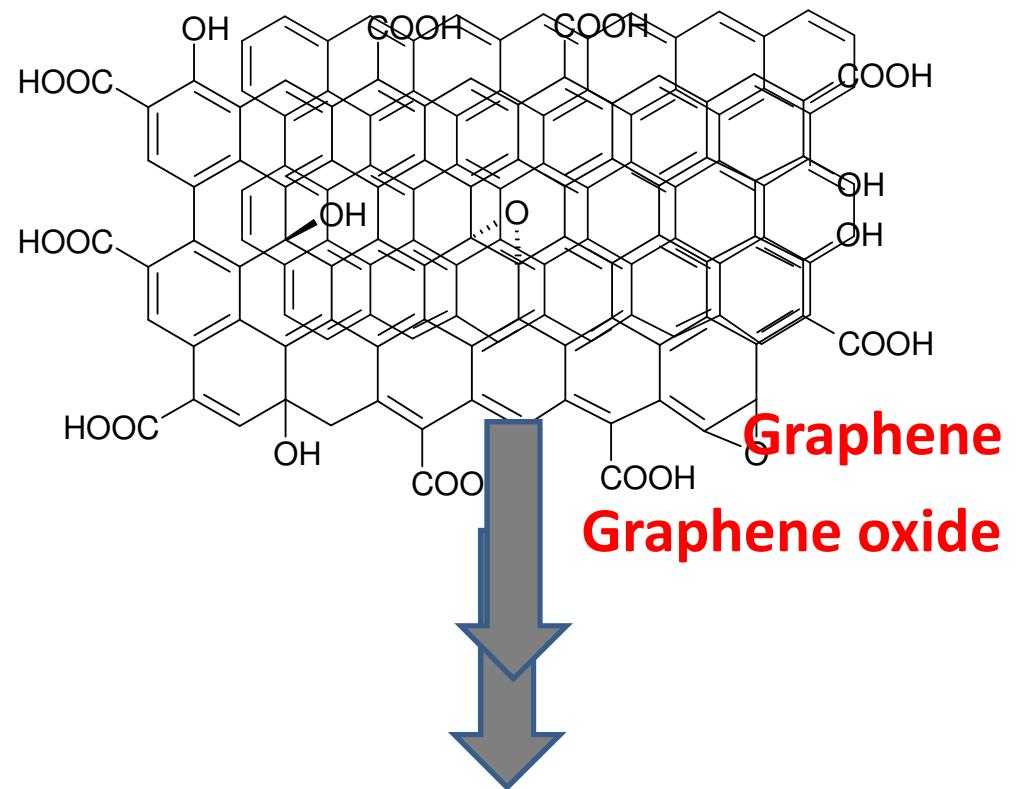
Baterije

Superkondenzatori

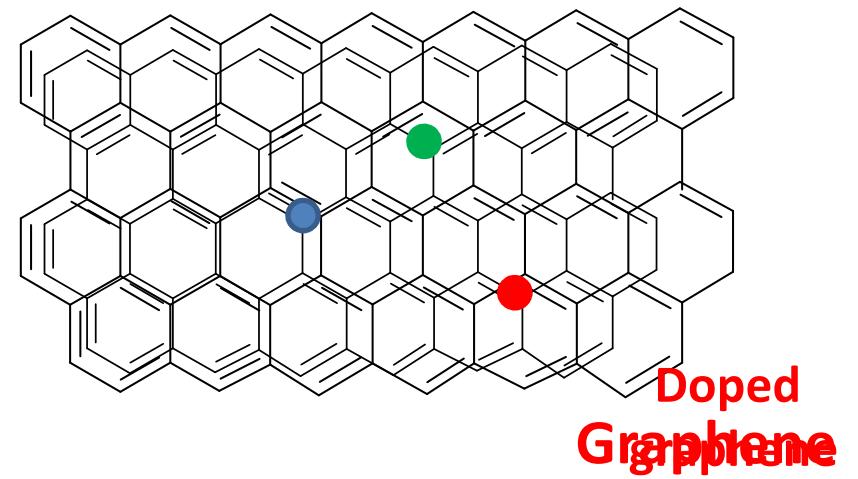
Improved graphene based anodes



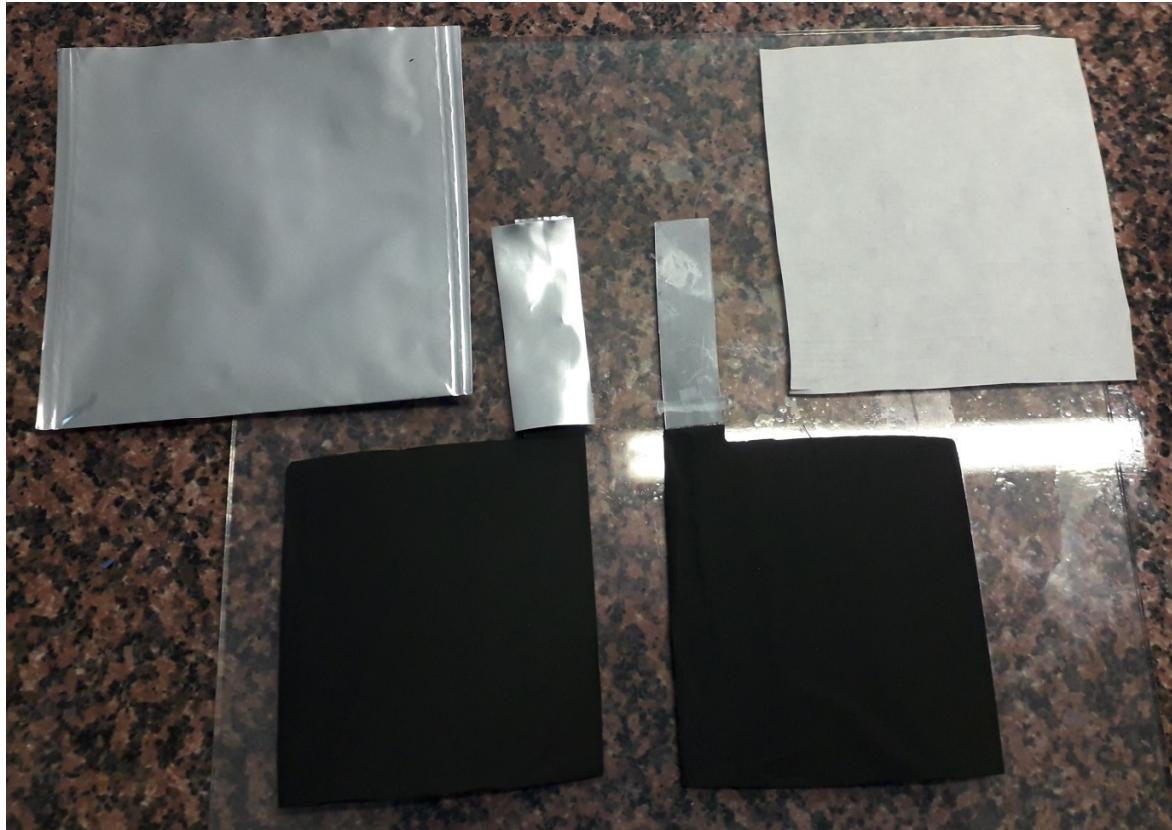
Modified
graphene oxide



Graphene
Graphene oxide



Doped
Graphene



	Commercial	Assembled
Specific capacitance [F/g]	18.6	21.1
Specific ESR [Ωcm^2]	1.26	2.60
Specific energy density [J/g]	69	79
Specific power density [W/g]	135	270