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From rubbish to biopolymers and to platform chemicals for polymer nanocomposites

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1. Aminoacids from *Hermetia illucens* polypeptides as platform chemicals



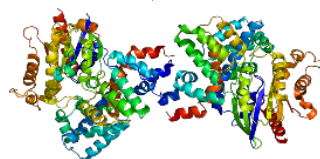
Food urban waste
as feed for insects



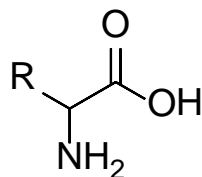
RICH Project
(CARIPLO)



Hermetia illucens (black soldier fly)
as the insect



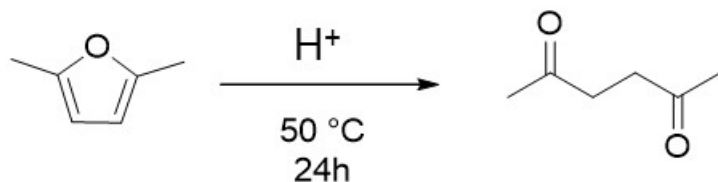
Proteins
extracted from the larvae of *Hermetia Illucens*,
as the source of chemicals



Isolation (hydrolysis)
of α -aminoacids

2. Janus Molecules from aminoacids through a biobased synthesis

2,5-hexanedione from dimethylfuran



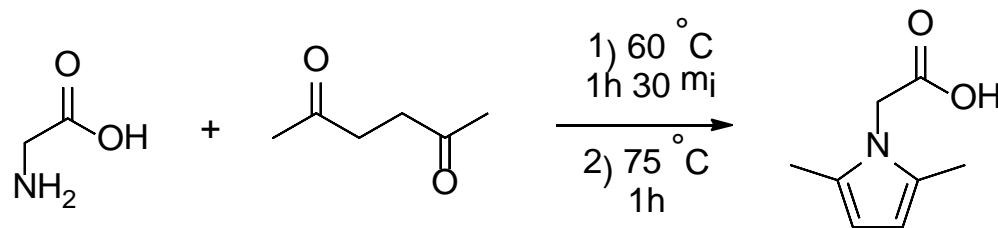
95% yield

high atom efficiency,

no solvents,

no purification steps

Paal Knorr reaction of glycine with 2,5-hexanedione



98% yield

high atom efficiency,

no solvents,

no purification steps

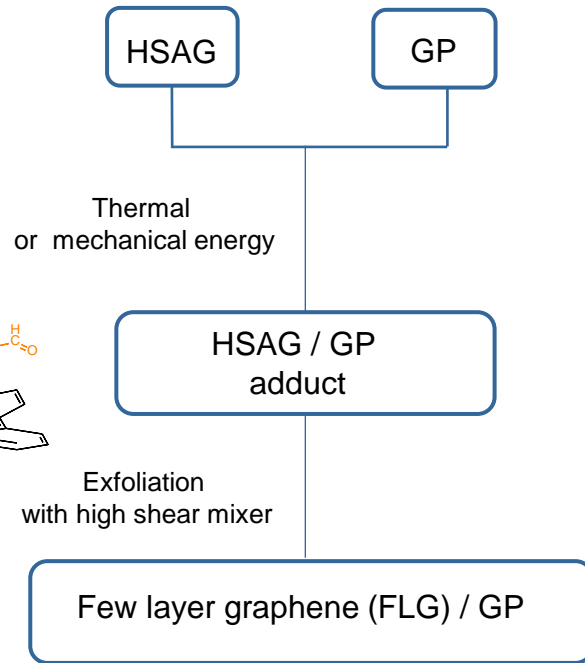
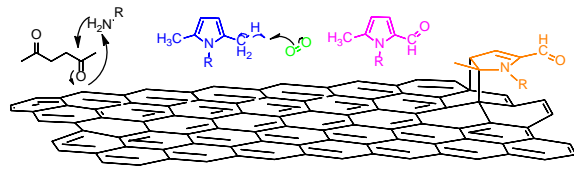
2-(2,5-dimethyl-1H-pyrrol-1-yl)acetic acid

Glycine pyrrole

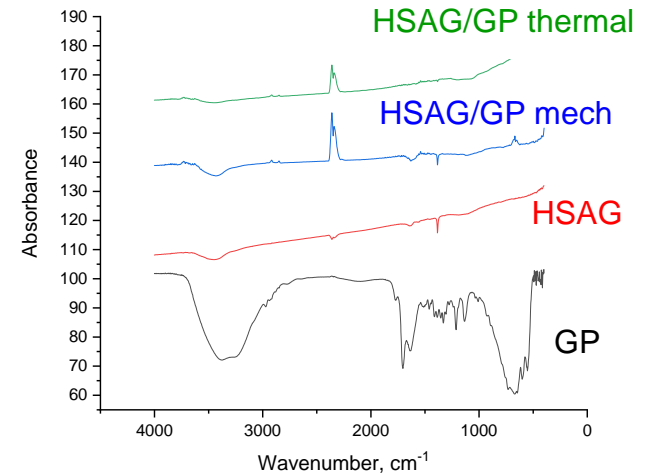
GP

3. Few layer graphene functionalized with GP for polymer nanocomposites

HSAG = nanosized high surface area graphite



GP = Glycid pyrrole



Polymer nanocomposites

Elastomers

Bionanocomposites

Conductive inks