CARBON FROM BIOWASTE

Devy Kartika Ratnasari*, Natalia Skorodumova

KTH Royal Institute of Technology, Brinellvägen 23, 114 28 Stockholm; *dkra@kth.se

Most of commercial carbon are produced from fossil fuel-based precursor, which are expensive and nonrenewable. Others are produced from coconut shells, which are not native to non-tropical countries (including Sweden). In addition, most of commercial carbon are prepared under harsh and complicated conditions, such as high temperature and high vacuum, which are expensive and energy consuming. Therefore, an approach towards carbon synthesis based on renewable resources would be a significant contribution. Considering the business cost, wide availability, and energy/environmental concerns, biowaste is a potential precursor to produce carbon.

INDUSTRIAL
MUNICIPAL
Activities

BIOWASTE MATERIAL

AGRICULTURAL
FORESTRY
Activities

Renewable precursor, low cost material, abundant in amount, and environmentally friendly.
Biowaste materials includes forestry and agricultural residues, sewage sludge, garden waste, and so on.

CONVERSION OF BIOWASTE TO CARBON

Stage 1

CARBONIZATION

Low temperature process (<1000K), short process time (<1 hour), no activation gas.

Stage 2

ACTIVATION

Less post-washing process, less water consumption, and safety discharge of wastewater.

CARBON PRODUCTION

SPECIFIC CAPACITANCE
up to 400 F/G

BET SURFACE AREA
>2000 m2/g

The material cost and process cost can be remarkably reduced by sustainable production.
Carbon has several different uses.

- Filter for Water and Air Purification
- Replacing Coal in Steel Making
- Electrode for Battery and Supercapacitor
- Metal Recovery
- Fertilizer and Soil Amendment