Graphene-like highly porous activated carbon derived from wild plant for carbon dioxide capture

Yunus Emre ŞİMŞEK

Bilecik Şeyh Edebali University, Chemical Engineering Department, Bilecik-TURKEY

(yunusemre.simsek@bilecik.edu.tr)

Abstract

Greenhouse gases like carbon dioxide (CO_2), nitrous oxide (NO_2), and methane (CH_4) retain the heat in the atmosphere. With higher than natural concentrations, they cause unnatural atmospheric warming. Among greenhouse gases, carbon dioxide (CO_2) is one of the major contributor to global warming and subsequently climate change. Current CO_2 concentration levels are around 100 ppm higher than at any time in the last million years and continuing to increase dramatically. Several technologies have been proposed to tackle the swift and abrupt CO_2 change issue. The major advantages of adsorption process through adsorbents such as zeolite, metal organic frameworks and activated carbon are sustainable and easy to operate at mild temperatures. The aim of this work is develop and investigate elaborately activated carbon derived from wild plant though chemical activation method using different activating agents and impregnation ratios. The produced adsorbents were characterized for their textural properties using N_2 adsorption at 77 K, and CO_2 adsorption isotherms at 273 K. SEM and TEM analysis were used to investigate textural properties and microstructure. Surface functional groups and G-D peaks, and inter-layer spacing were determined by FTIR, Raman Spectroscopy, and XRD analysis, respectively. $ZnCl_2$ impregnated carbons has been found to show excellent CO_2 uptake.

Keywords: *Carbon dioxide capture, chemical activation, activated carbon, characterization*