Activated carbons from fast pyrolysis biochar as novel catalysts for the post-treatment of pyrolysis vapors, studied by analytical pyrolysis

Taina Ohra-aho1,\*, Christian Lindfors1, Juha Lehtonen1, Tarja Tamminen1 and Virpi Siipola1

1 VTT Technical Research Centre of Finland Ltd, P.O.Box 1000, FI-02044 VTT, Espoo, Finland; christian.lindfors@vtt.fi (C.L.); juha.lehtonen@vtt.fi (J.L.); tarja.tamminen@vtt.fi (T.T.); virpi.siipola@vtt.fi (V.S.)

**\*** Correspondence: taina.ohra-aho@vtt.fi; Tel.: +358 40 5709 322 (T.O.)

Supporting material



Figure S1. Gas and water release in thermal pyrolysis of pine (pyrolysis\_No catalyst) and in post-treatment of pine pyrolysis vapours using four times the same original willow activated carbon (AC) as catalyst. Compounds analysed by GC/MSD.



Figure S2. Polysaccharide and lignin pyrolysis derivatives released in thermal pyrolysis pine and in post-treatment of pine pyrolysis vapours using four times the same original willow activated carbon (AC) as catalyst. Compounds analysed by GC-FID.



Figure S3. Total ion chromatograms of two pyrolysis runs with willow BC without biomass a) pretreatment 1 and b) pretreatment 2 and c) post-treatment of pine pyrolysis vapours using pretreated willow BC as catalyst.



Figure S4. Total ion chromatograms of two pyrolysis runs with willow AC without biomass a) pretreatment 1 and b) pretreatment 2 and c) post-treatment of pine pyrolysis vapours using pretreated willow AC as catalyst.