



Supplementary Information

Enhanced Fire Safety of Rigid Polyurethane Foam via Synergistic Effect of Phosphorus/Nitrogen Compounds and Expandable Graphite

Chuan Liu ^{1,+}, Ping Zhang ^{2,+}, Yongqian Shi ^{1,*}, Xiaohui Rao ¹, Suncheng Cai ¹, Libi Fu ³, Yuezhan Feng ⁴, Liancong Wang ^{5,*}, Xueqin Zheng ⁶ and Wei Yang ^{7,*}

- ¹ College of Environment and Resources, Fuzhou University, 2 Xueyuan Road, Fuzhou 350116, China; liuchuanll@163.com (C.L.); Rxh123456789m88@163.com (X.R.); dandy_cai@163.com (S.C.)
- ² State key Laboratory of Environmental Friendly Energy Materials & Department of Materials, Southwest University of Science and Technology, Mianyang 621010, China; pingzhang@swust.edu.cn
- ³ College of Civil Engineering, Fuzhou University, 2 Xueyuan Road, Fuzhou 350116, China; fulibi@fzu.edu.cn
- ⁴ Key Laboratory of Materials Processing and Mold Ministry of Education, National Engineering Research Center for Advanced Polymer Processing Technology, Zhengzhou University, Zhengzhou 450002, China; yzfeng@zzu.edu.cn
- ⁵ State Key Laboratory of Coal Mine Safety Technology, CCTEG Shenyang Research Institute, Fushun 113122, China
- ⁶ College of Safety and Environment, Fujian Chuanzheng Communications College, 80 Shoushan Road, Fuzhou 350007, China; zhengxueqin815@foxmail.com
- ⁷ School of Energy, Materials and Chemical Engineering, Hefei University, Hefei 230601, China
- * Correspondence: shiyq1986@fzu.edu.cn (Y.S.); wangliancong-0829@163.com (L.W.); yangwei@hfuu.edu.cn (W.Y.)
- + These authors contributed equally to this work.



Additional Supporting Data

Figure S1. Digital photos of char residues of (a) RPUF-1, (b) RPUF-2, (c) RPUF-3, (d) RPUF-4, (e) RPUF-5 and (f) RPUF-6 after cone calorimeter test.



Figure S2. SEM images of external char residues of (**a**) RPUF-1, (**b**) RPUF-2, (**c**) RPUF-3, (**d**) RPUF-4, (**e**) RPUF-5 and (**f**) RPUF-6.



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).