**SUPPLEMENTARY MATERIAL**

Supplemental Table 1 Physical and chemical properties, and toxicity equivalency factors (TEF) of 27 PAHs investigated

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Compound | Abbreviation | Ring number | Molecular weight (Da) | Boiling point (oC) | Melting point (oC) | Vapor pressure (mmHg) | TEF |
| 16 PAHs issued by the U.S. EPA | Naphthalene | Nap | 2 | 128.19 | 218 | 81 | 7.80×10-2 | 0.001 |
| Acenaphthylene | AcPy | 3 | 152.21 | 270 | 93 | 6.70×10-3 | 0.001 |
| Acenaphthene | Acp | 3 | 154.21 | 279 | 96 | 2.15×10-3 | 0.001 |
| Flourene | Flu | 3 | 166.23 | 293 | 117 | 6.00×10-4 | 0.001 |
| Phenanthrene | PA | 3 | 178.24 | 338.4 | 101 | 1.20×10-4 | 0.001 |
| Anthracene | Ant | 3 | 178.24 | 340 | 216 | 6.00×10-6 | 0.01 |
| Fluoranthene | FL | 4 | 202.00 | 383.5 | 111 | 9.20×10-6 | 0.001 |
| Pyrene | Pyr | 4 | 202.26 | 393.5 | 202 | 4.50×10-7 | 0.001 |
| Benzo[a]anthracene | BaA | 4 | 228.30 | 437.5 | 162 | 2.10×10-7 | 0.1 |
| Chrysene | CHR | 4 | 228.30 | 441 | 256 | 6.40×10-9 | 0.01 |
| Benzo[b]fluoranthene | BbF | 5 | 252.32 | 481.2 | 168 | 5.0×10-7 | 0.1 |
| Benzo[k]fluoranthene | BkF | 5 | 252.32 | 481.2 | 217 | 3.91×10-9 | 0.1 |
| Benzo[a]pyrene | BaP | 5 | 252.32 | 495.5 | 177 | 5.60×10-9 | 1.0 |
| Dibenzo[a,h]anthracene | DBA | 5 | 278.36 | 534 | 163 | 1.04×10-10 | 1.0 |
| Benzo[g,h,i]perylene | BghiP | 6 | 276.34 | 535 | 270 | 1.01×10-11 | 0.01 |
| Indeno[1,2,3-cd]pyrene | IND | 6 | 276 | 542 | 278 | 9.78×10-11 | 0.1 |
| 11 additional measured in the study | Benzo[c]fluorene | BcFE | 4 | 216.28 | 398 | 126 | 3.43×10-6 | 20 |
| 5-Methylchrysene | 5-MC | 4 | 242.32 | 413 | 161 | 4.65×10-6 | 1.0 |
| Benzo[j]fluoranthene | BjF | 5 | 252.31 | 480 | 165 | 1.66×10-7 | 0.3 |
| Cyclopenta[c,d]pyrene | CYC | 5 | 226.27 | 493 | 170 | 5.66×10-6 | 0.01 |
| Dibenzo[a,e]pyrene | DBP | 6 | 302.37 | 501 | 225 | 4.33×10-8 | 1.0 |
| Dibenzo[a,h]pyrene | DBahP | 6 | 302.37 | 507 | 233 | 1.53×10-8 | 10 |
| Dibenzo[a,i]pyrene | DBaiP | 6 | 302.37 | 507 | 233 | 1.53×10-8 | 10 |
| Dibenzo[a,l]pyrene | DBalP | 6 | 302.37 | 501 | 225 | 4.33×10-8 | 10 |
| 2-Methylnaphthalene | 2-MN | 2 | 142.20 | 241 | 34.6 | 6.8×10-2 | 0.001 |
| Benzo[e]pyrene | BeP | 5 | 252.32 | 492 | 178 | 5.7×10-9 | 0.01 |
| Perylene | PER | 5 | 252.32 | 500 | 273 | 5.31×10-9 | 0.001 |

Supplemental Table 2 Comparison of FPM2.5 and CPM emissions from different studies (mg/Nm3)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | APCDs | FPM  | FPM2.5 | CPM | Reference |
| Coal-fired boiler | SCR+ESP+WFGD+WESP | 0.90 | 0.09 | 37.4 | This study |
| Coal-fired boiler | SCR+ESP+WFGD | 5.10 | 1.90 | 28.0 | Lu et al. (2019)Lu et al. (2019) |
| Coal-fired boiler | SCR+ESP+SWFGD | 0.60 | 0.45 | 12.7 |
| Coal-fired power plant | SCR+ESP+WFGD+WESP |  | 1.10 | 7.90 | Li et al. (2017) |
| Coal-fired boiler | Cyclone + BH |  | 5.97 | 16.6 | Yang et al. (2019) |