Table 4: Vibration modes and mode assignments for the ATR FT-IR spectra (Melissa et al., 2018).

|  |  |  |  |
| --- | --- | --- | --- |
| Polymer | Chemical structure | Absorption bands  (cm-1) | Assignment |
| Polypropylene (PP) |  | 2950 | C-H stretch |
| 2915 | C-H stretch |
| 2838 | C-H stretch |
| 1455 | CH2 bend |
| 1377 | CH3 bend |
| 1166 | CH bend, CH3 rock, C-C stretch |
| 997 | CH3 rock, CH3 bend, CH bend |
| 972 | CH3 rock, C-C stretch |
| 840 | CH2 rock, C-CH3 stretch |
| 808 | CH2 rock, C-C stretch, C-CH stretch |
| Polyethylene (PE) |  | 2915 | C-H stretch |
| 2845 | C-H stretch |
| 1467 | CH2 bend |
| 1462 | CH2 bend |
| 1377 | CH3 bend |
| 730 | CH2 rock |
| 717 | CH2 rock |
| Polyethylene terephthalate (PET) |  | 1713 | C=O stretch |
| 1241 | C-O stretch |
| 1094 | C-O stretch |
| 720 | Aromatic CH out of plane bend |
| Ethylene vinyl acetate (EVA) |  | 2917 | C-H stretch |
| 2848 | C-H stretch |
| 1740 | C=O stretch |
| 1464 | CH2 bend, CH3bend |
| 1241 | C(=O)O stretch |
| 1020 | C-O stretch |
| 720 | CH2 ­rock |
| Nylon (all polyamides) |  | 3298 | N-H stretch |
| 2932 | CH stretch |
| 2858 | CH stretch |
| 1634 | C=O stretch |
| 1538 | NH bend, C-N stretch |
| 1464 | CH2 bend |
| 1372 | CH2 bend |
| 1274 | NH bend, C-N stretch |
| 1199 | CH2 bend |
| 687 | NH bend, C=O bend |

Table 5: ATR FT-IR result for selected microplastic.

|  |  |
| --- | --- |
| Absorption band | ATR FT-IR Result |
| S1: Polypropylene (PP)   1. 2951.05 cm-1 2. 2918.44 cm-1 3. 2840.72 cm-1 4. 1456.21 cm-1 5. 1375.96 cm-1 6. 1166.81 cm-1 7. 998.50 cm-1 8. 973.54 cm-1 9. 841.12 cm-1 10. 808.84 cm-1 | (j)  (i)  (h)  (g)  (f)  (c)  (e)  (d)  (b)  (a) |
| S2: Polyethylene (PE)   1. 2915.83 cm-1 2. 2848.14 cm-1 3. 1465.05 cm-1 4. 1378.43 cm-1 5. 717.33 cm-1 | (a)  (e)  (d)  (c)  (b)  PE |
| S3: Polyethylene terephthalate (PET)   1. 1713.25 cm-1 2. 1243.68 cm-1 3. 1093.66 cm-1 4. 724.43 cm-1 | PET  (c)  (d)  (b)  (a) |
| S4: Ethylene vinyl acetate (EVA)   1. 2922.10 cm-1 2. 2853.11 cm-1 3. 1710.59 cm-1 4. 1454.29 cm-1 5. 1242.25 cm-1 6. 1018.08 cm-1 7. 724.93 cm-1 | (g)  (f)  (e)  (d)  (b)  (c)  (a)  EVA |
| S5: Nylon (all polyamides)   1. 3273.41 cm-1 2. 2922.69 cm-1 3. 2853.06 cm-1 4. 1623.85 cm-1 5. 1528.54 cm-1 | (e)  (d)  (c)  (b)  (a)  Nylon |