

Identification of micro- and nanoplastic released from medical mask using hyperspectral imaging and deep learning

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Supplementary Materials:

Tables:

Table S1. The per-class performance metrics of the models classified the intact surgical mask samples. The highest values are marked as bold. SAM – spectral angle mapping; 1D-CNN – one-dimensional convolutional neural network; SNV – standard normal variate; MSC – multiplicative scatter correction; S – spunbond class; M – meltblown class; B – background class

| Algorithm | Preprocessing of dataset | Accuracy    |             |             | Precision   |             |             | Recall      |             |             | F-score     |             |             |
|-----------|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|           |                          | S           | M           | B           | S           | M           | B           | S           | M           | B           | S           | M           | B           |
| SAM       | RAW                      | <b>0.85</b> | 0.88        | <b>0.93</b> | <b>0.82</b> | 0.82        | 0.85        | 0.72        | 0.81        | <b>0.96</b> | 0.73        | 0.81        | <b>0.89</b> |
|           | RAW                      | 0.78        | <b>0.95</b> | 0.81        | 0.58        | 0.91        | <b>1.00</b> | 0.94        | <b>0.92</b> | 0.54        | 0.71        | <b>0.92</b> | 0.70        |
| 1D-CNN    | SNV                      | 0.81        | <b>0.95</b> | 0.85        | 0.61        | <b>0.93</b> | <b>1.00</b> | <b>0.95</b> | 0.90        | 0.64        | <b>0.74</b> | 0.91        | 0.78        |
|           | MSC                      | 0.82        | 0.89        | 0.84        | 0.64        | 0.78        | 0.99        | 0.86        | <b>0.92</b> | 0.60        | <b>0.74</b> | 0.83        | 0.75        |

Table S2. The per-class performance metrics of the models classified the UV-exposed (192 h) surgical mask samples. The highest values are marked as bold. SAM – spectral angle mapping; 1D-CNN – one-dimensional convolutional neural network; SNV – standard normal variate; MSC – multiplicative scatter correction; S – spunbond class; M – meltblown class; B – background class

| Algorithm | Preprocessing of dataset | Accuracy    |             |             | Precision   |             |             | Recall      |             |             | F-score     |             |             |
|-----------|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|           |                          | S           | M           | B           | S           | M           | B           | S           | M           | B           | S           | M           | B           |
| SAM       | RAW                      | 0.73        | 0.72        | 0.83        | 0.43        | 0.41        | 0.75        | 0.25        | 0.31        | <b>0.99</b> | 0.31        | 0.35        | 0.86        |
|           | RAW                      | <b>0.74</b> | <b>0.73</b> | <b>0.96</b> | 0.47        | <b>0.45</b> | <b>0.94</b> | 0.51        | 0.38        | 0.98        | 0.49        | 0.41        | <b>0.96</b> |
| 1D-CNN    | SNV                      | <b>0.74</b> | <b>0.73</b> | <b>0.96</b> | <b>0.49</b> | 0.44        | 0.93        | <b>0.58</b> | 0.31        | <b>0.99</b> | <b>0.53</b> | 0.36        | <b>0.96</b> |
|           | MSC                      | <b>0.74</b> | 0.72        | 0.93        | 0.47        | <b>0.45</b> | 0.89        | 0.37        | <b>0.47</b> | 0.97        | 0.41        | <b>0.46</b> | 0.93        |