

Steam disinfection releases micro(nano)plastics from silicone-rubber baby teats as examined by optical photothermal infrared microspectroscopy

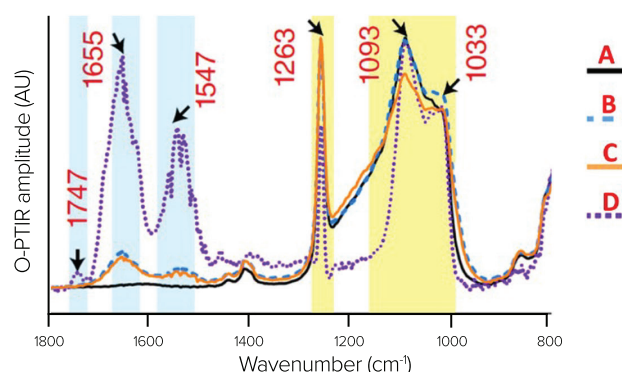
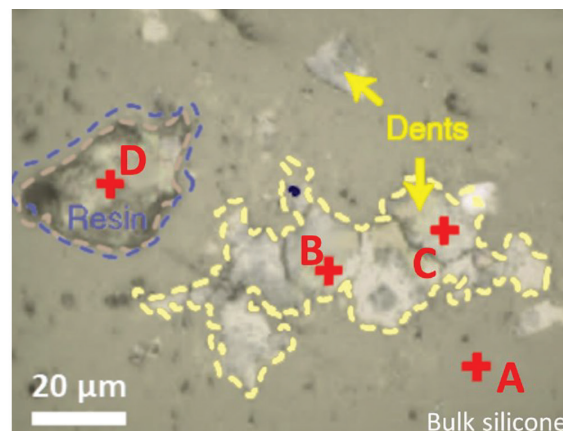
Enabled by submicron spatial resolution optical photothermal infrared spectroscopy (O-PTIR), the entitled literature presents the first comprehensive study of microplastic generation: from steam-sterilizing silicone nipples/teats in baby formula bottles.

Su et. al. found that the surface sensitive O-PTIR instrument can separate silicone/polyamide polymeric domains from steam-sterilized bulk silicone. This observation could be correlated with the washes from the same, consequently confirming the release of MNP from the silicone material.

O-PTIR spectra of irregularly shaped isolated particles from ~600nm to tens of microns was found to maintain band shapes consistent to ideal FT-IR spectra. This unique spectroscopic characteristic ensured of accurate material identification, irrespective of particle sizes and shapes.

The O-PTIR technique has demonstrated excellent signal recovery for micro- and nanoplastics fragments. This led to yielding high confidence in the total consumption of micro and nanoplastics particles per infant over a period of 1.5 years (around 1 million pieces in that span)

The non-contact reflection mode operation of the O-PTIR technique enhances the confidence of analyses by eliminating doubts of cross contamination. This ensures accurate and precise chemical identification of unknown micro- and nanoplastics in a highly heterogenous material.



Y. Su, et. al.

Nanjing University, China

Nature Nanotechnology, 2021