Electronic Supplementary Material (ESI) for Analyst.

Supporting information

Quantification of drug loading in polymeric nanoparticles using AFM-IR technique: a novel method to map and evaluate drug distribution in drug nanocarriers

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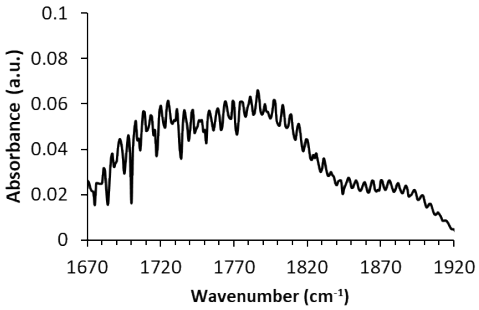

Figure SI 1. Power of QCL laser in function of the wavenumber recorded with a power meter and used as background for the local spectra recorded in AFM-IR

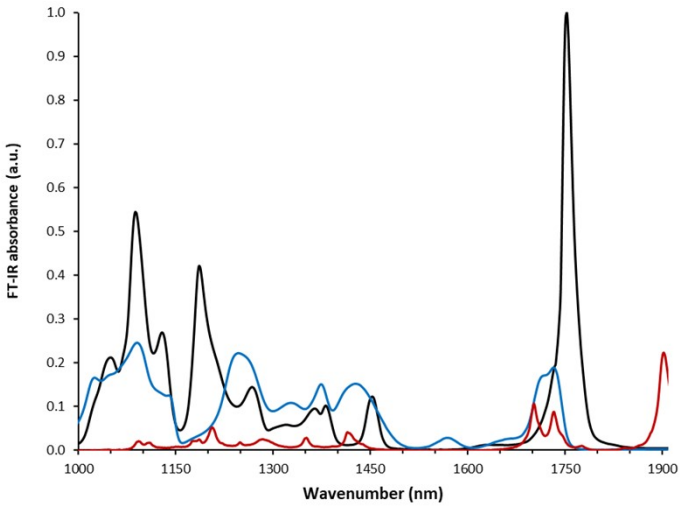

Figure SI 2. ATR-FTIR spectra of the compounds used to prepare films and/or NPs; PLA (black), PVA (blue), drug (red).

PLA has a characteristic CH_3 group appearing at 1068 and 1133 cm^{-1}. The bands at 1090 and 1188 cm^{-1} correspond to the C-O-C ester bond stretching. Furthermore, C-H bending bands are found in the region 1300-1500 cm^{-1}. The band at 1760 cm-1 was attributed to stretching of the C=O of carboxylic acid group. For PVA, the characteristic absorption bands are identified for C=O at 1724 cm-1, and for CH bending at 1415 cm^{-1} CH2 wagging was at 1390 cm^{-1}, CH wagging at 1268 cm^{-1}, C-C and C-O-C stretching at 1151 cm^{-1}, C=O stretching at 1106 cm^{-1} and C-O stretching at 1045 cm^{-1}. In addition, C=O of carboxylic acid group of the drug was at 1699 and 1729 $cm^{-1}$and strong CO stretching bands were found in the region at 1900 cm^{-1}.

Table SI1. Comparison of calibration curves performed with AFM-IR and IR microscopy on the films prepared with known concentrations. Standard deviations are less than 0.01.

	Ratio of intensities (I_{1900}/I_{1760})					
Calibration technique	**F(0)**	**F(0.03)**	**F(0.10)**	**F(0.15)**	**F(0.20)**	**Slope**
IR micro-spectroscopy	0	0.03	0.05	0.08	0.12	0. 57
AFM-IR	0	0.08	0.15	0.23	0.25	1.40

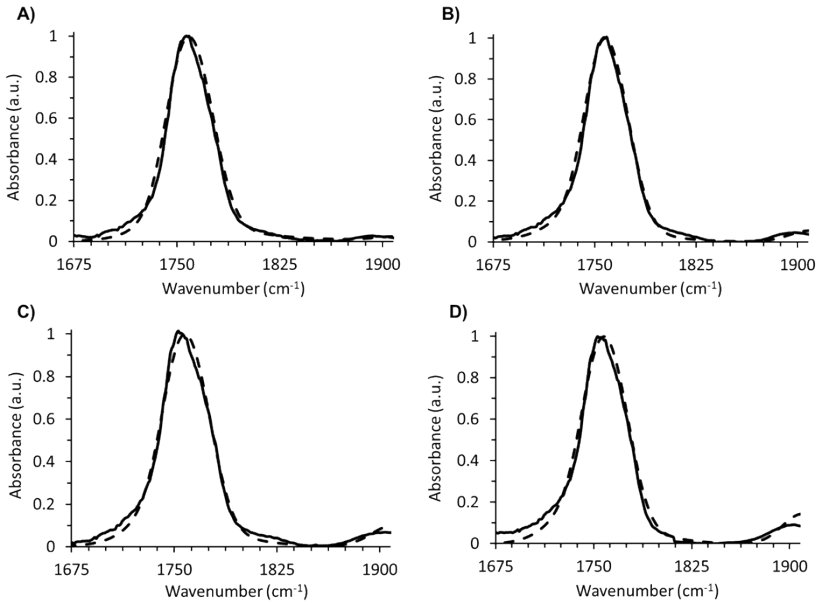

Figure SI3. Comparison of AFM-IR spectra (solid line) to IR-Mic spectra (dashed lines) of films A) F(0.03), B) F(0.10), C) F(0.15) and D) F(0.20). A scaling factor of 2.7 was applied to AFM-IR.