Supplemental Material

Optimizing the Analytical Performance of Substrate-Integrated Hollow Waveguides: Experiment and Simulation

L. Tamina Hagemann, Sonja Ehrle, Boris Mizaikoff,*

Institute of Analytical and Bioanalytical Chemistry, Albert-Einstein-Allee 11, 89081 Ulm, Germany

Corresponding author email: boris.mizaikoff@uni-ulm.de

Explanation of iHWG Geometry

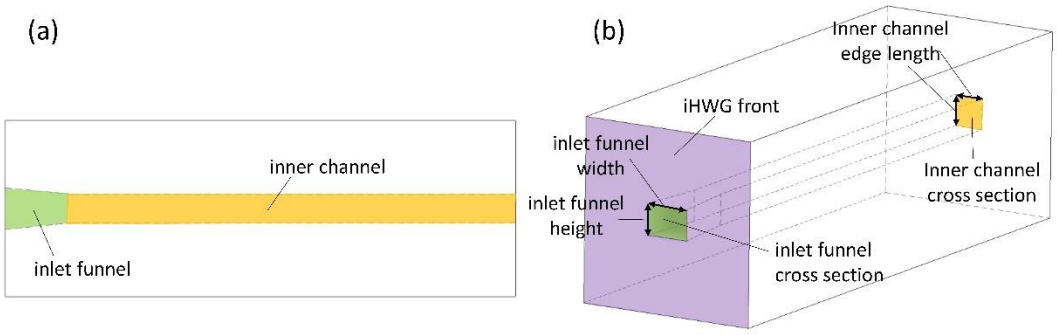


Figure S1. Schematic of an iHWG to explain the geometric terms used in this contribution. (a) View of iHWG from top. (b) Perspective view of iHWG. Inlet funnel width and inlet funnel height span the inlet funnel cross-section, through which the light enters the iHWG. The inner channel edge length spans a square inner channel cross-section.

iHWG-FTIR Setup

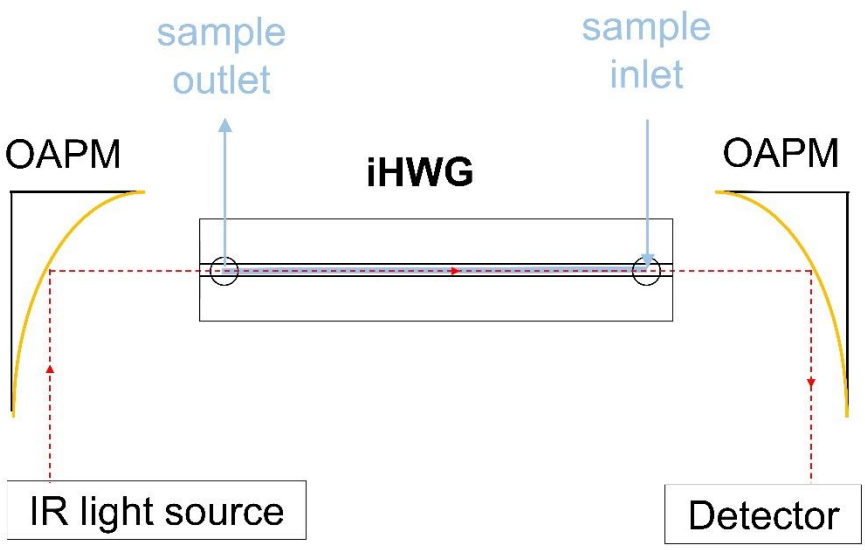
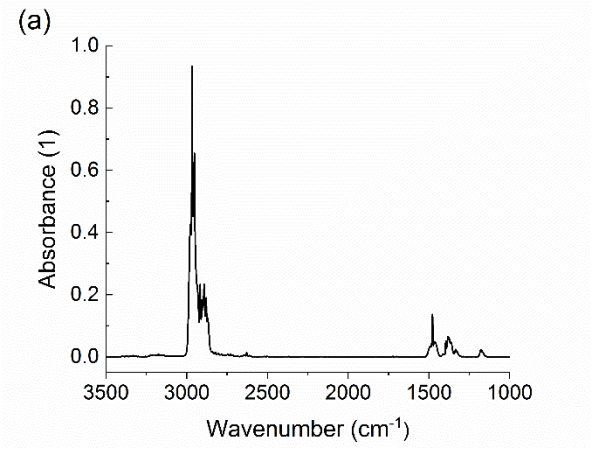


Figure S2. Experimental setup. IR light is coupled into and out of the iHWG and towards the detector via two OAPMs (dashed line). Gas sample flow between sample inlet and outlet is also indicated (solid line).

Exemplary IR Spectrum and Calibration Function for Isobutane



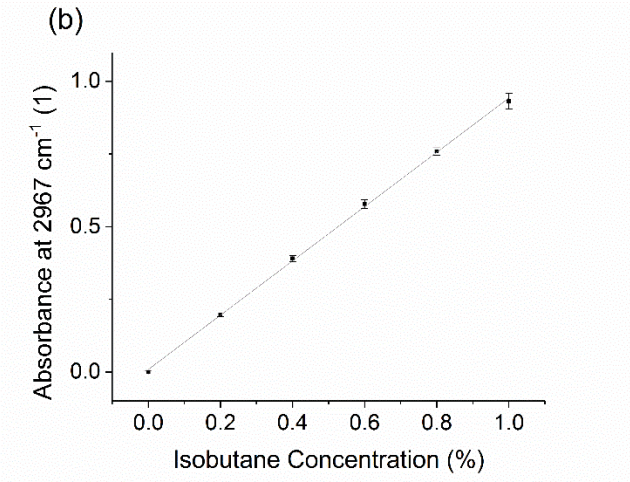


Figure S3. (a) Absorbance spectrum of 1% isobutane in air. (b) Isobutane calibration function with 10σ error bars exemplarily shown for iHWG #1.

Image of the Light Beam on the iHWG Front Facet

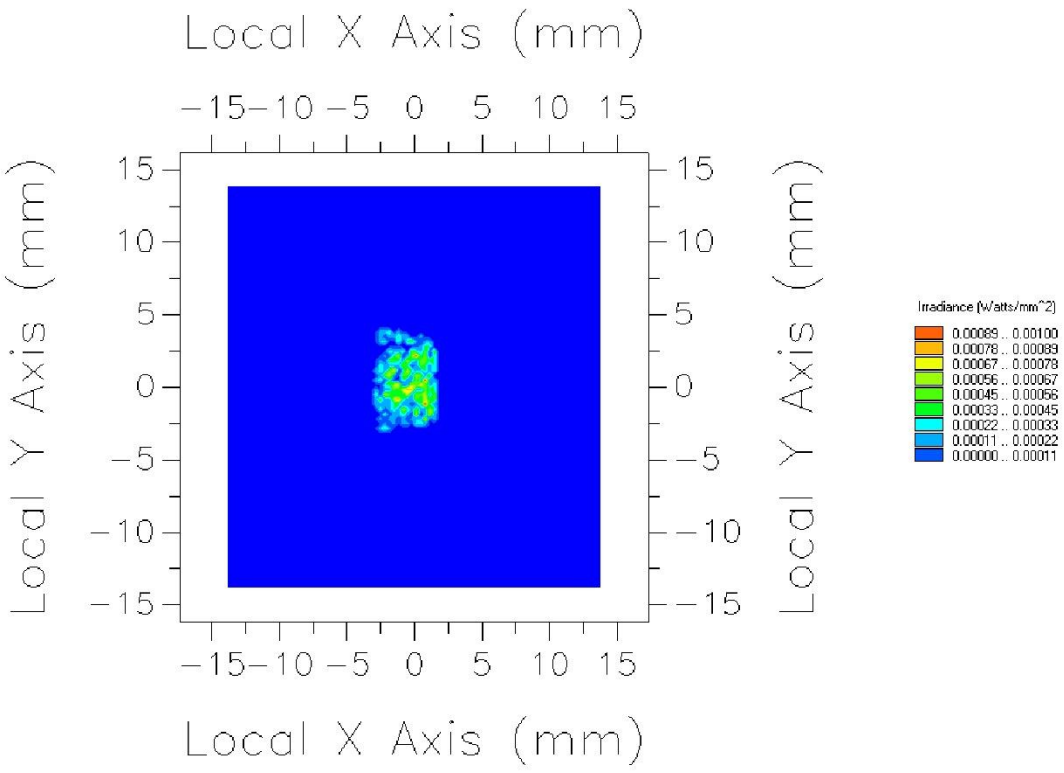


Figure S4. Image of the light beam incident at the iHWG front facet. The image has a rectangular shape and is about 5.5 mm wide and 7.9 mm high. Its intensity is not equally distributed over the whole rectangle, but instead shows the tendency to decay towards the rectangle's edges.