High-quality metamaterial dispersive grating on the facet of an optical fiber
(Supporting Information)

V. Savinov*
Optoelectronics Research Centre and Centre for Photonic Metamaterials,
University of Southampton, Southampton SO17 1BJ, UK

N. I. Zheludev
Optoelectronics Research Centre and Centre for Photonic Metamaterials,
University of Southampton, Southampton SO17 1BJ, UK and
Centre for Disruptive Photonic Technologies, TPI, SPMS,
Nanyang Technological University, Singapore 637371, Singapore

Figure S1. **Sensing performance of the fiber-tip metamaterial (model)**. The metamaterial-covered facet of fiber is surrounded by homogenous medium with ambient refractive index n. Light is launched at the metamaterial from the fiber side (with TM polarization). (a) Reflection of the metamaterial (back into the fiber) for four different ambient refractive indices close to that of water (in the near-infrared range). (b) Derivative of fiber-tip metamaterial reflection spectrum with respect to ambient refractive index (RIU stands for Refractive Index Unit), at ambient index of \( n = 1.32 \). **Inset:** Position of the dip (\( \lambda_0 \)) in the reflection spectra (shown in (a)) as a function of ambient refractive index (n). The gradient of the linear trend is 394 nm/RIU.

In Fig. S1 we present the (modelled) performance of the fiber-tip metamaterial in the typical biological sensing scenario. Fiber is surrounded by homogeneous medium with refractive index close to \( n = 1.32 \) (water). The metamaterial is illuminated by sending light down the fiber. The reflected light is collected by the spectrometer. The resonant response of the metamaterial will be affected by small changes in the ambient refractive index. This will be detectable as a change in the spectrum of the reflected light.

* v.savinov@orc.soton.ac.uk