

Packaged silica and chalcogenide microspheres and their applications for telecommunications

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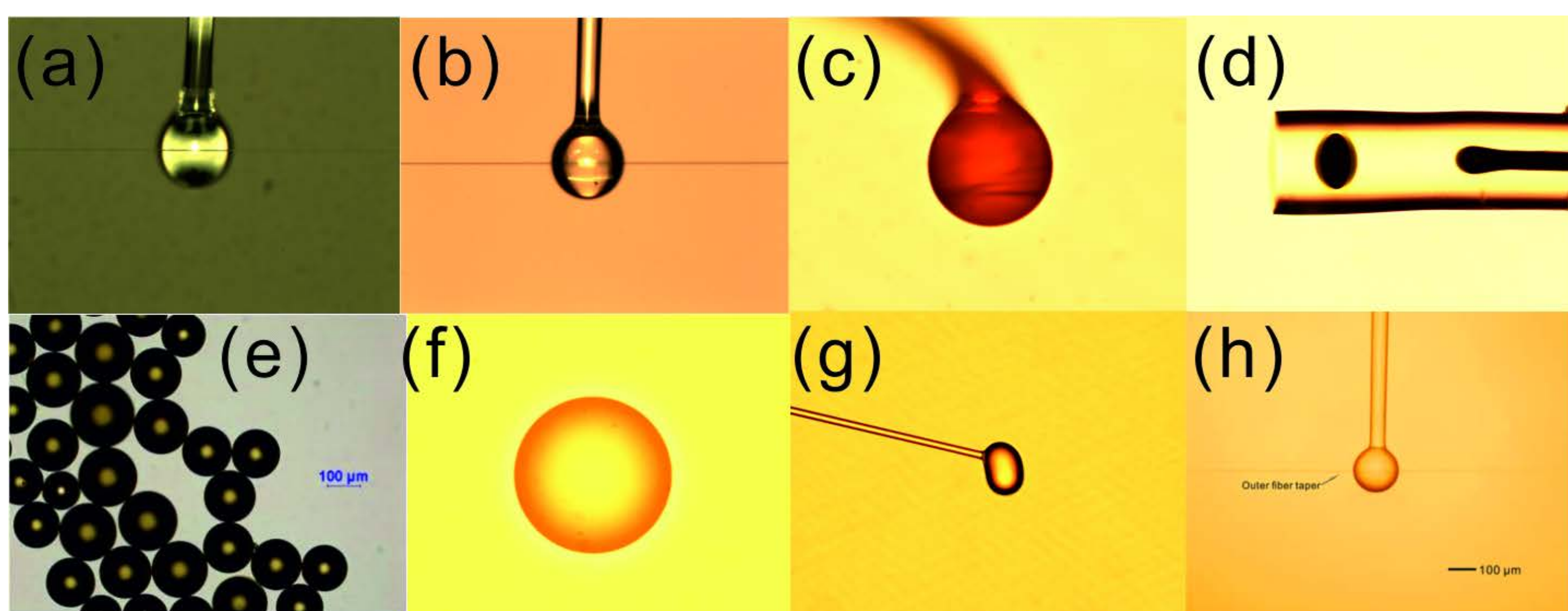
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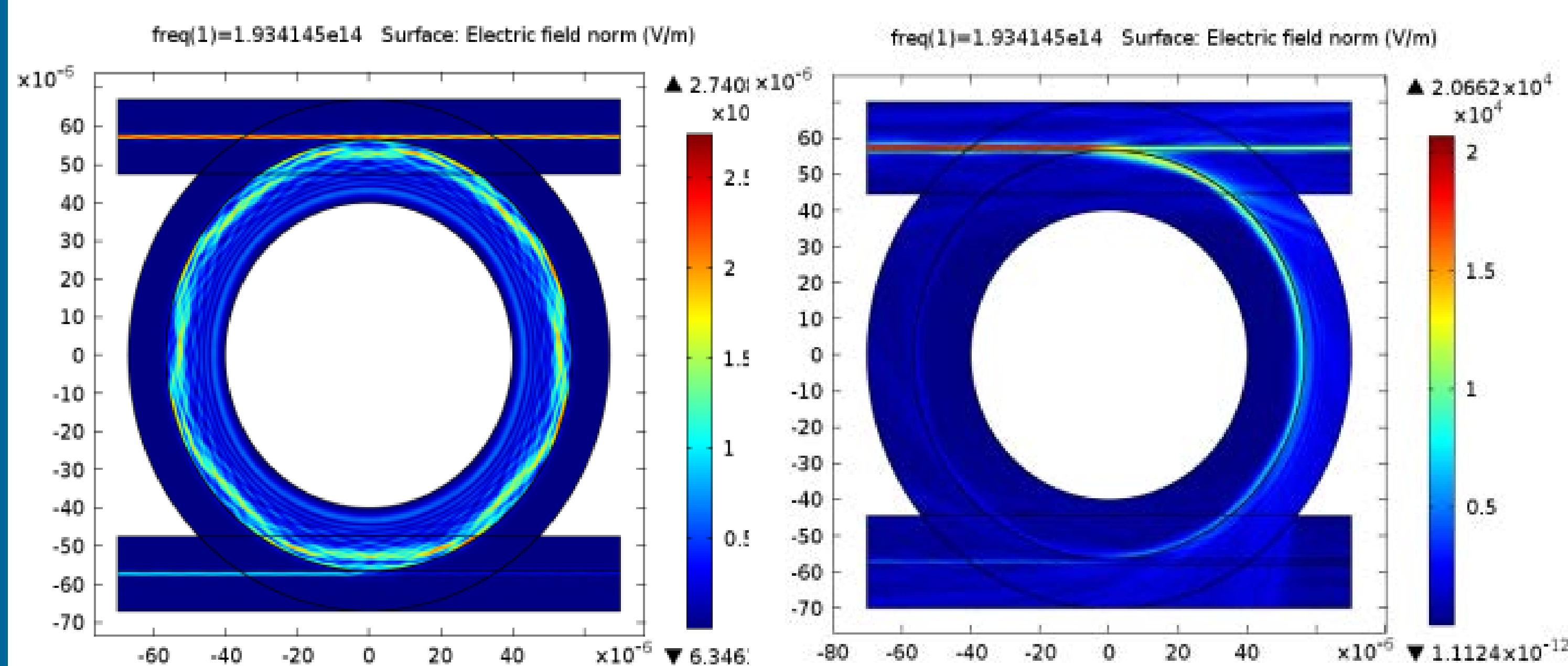
Objective

To investigate, both theoretically and experimentally, packaged silica and chalcogenide microsphere and their potential applications in telecommunication.

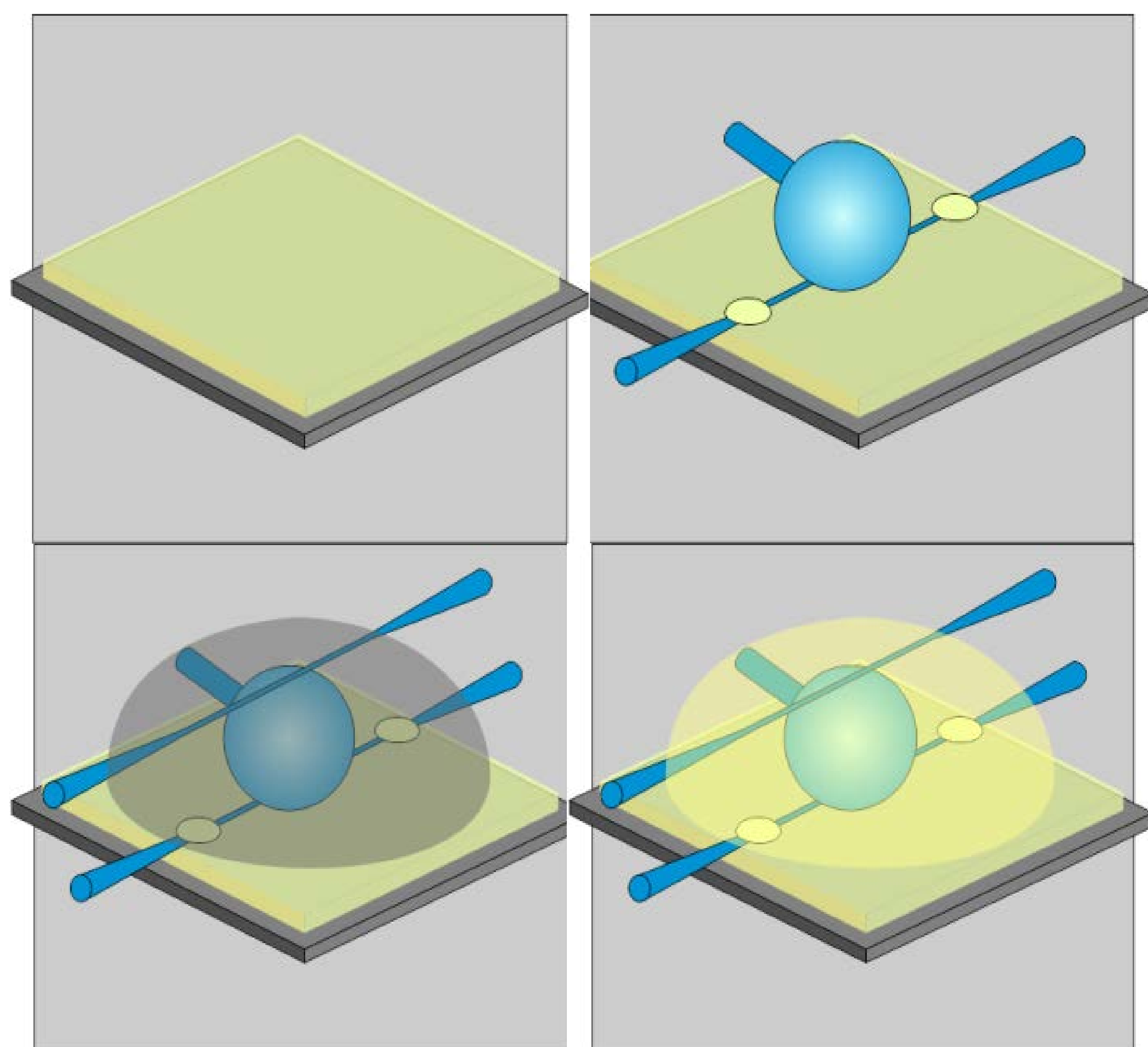
Silica and soft glass microspheres fabricated to date



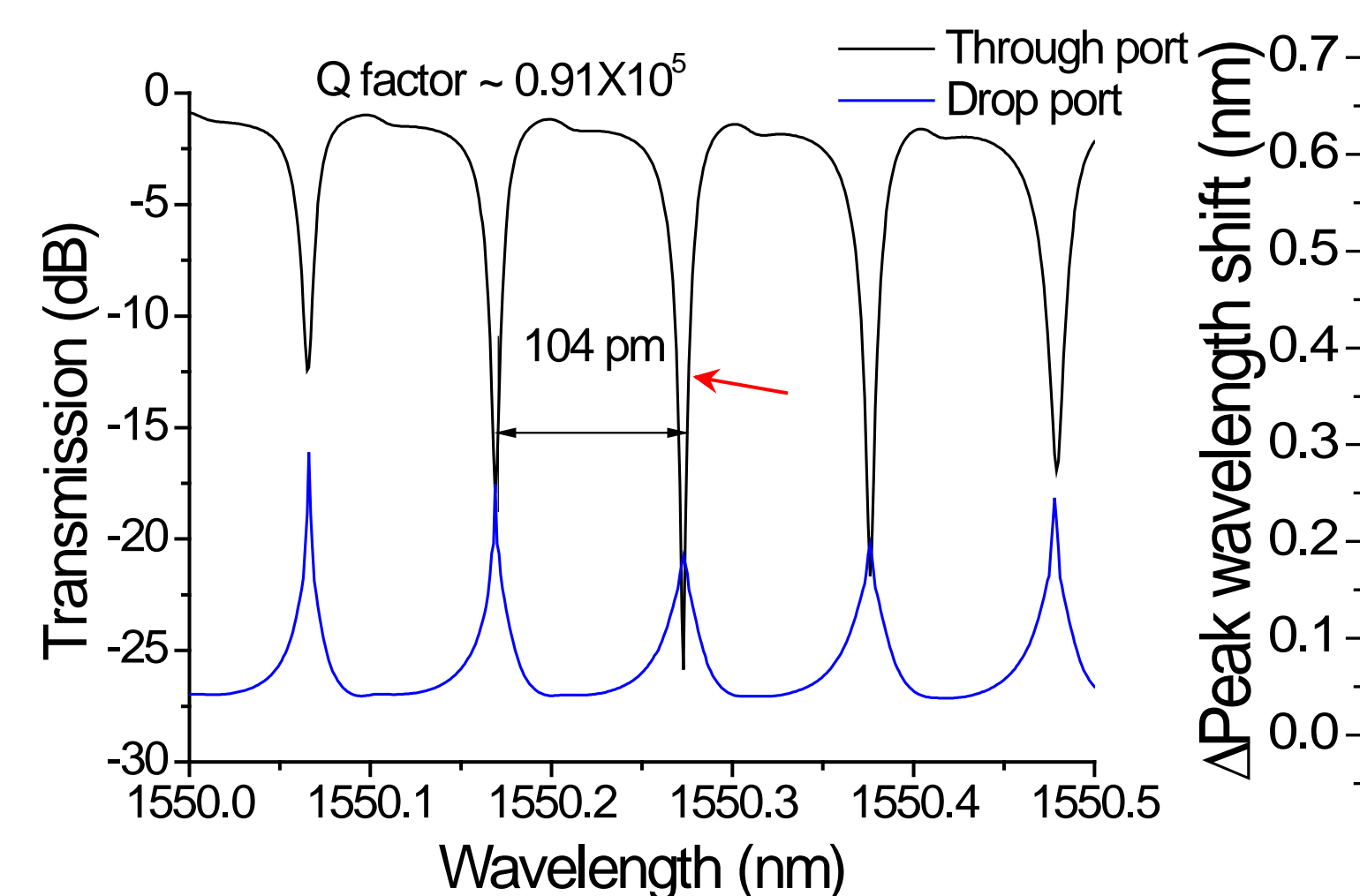
Packaged silica microsphere



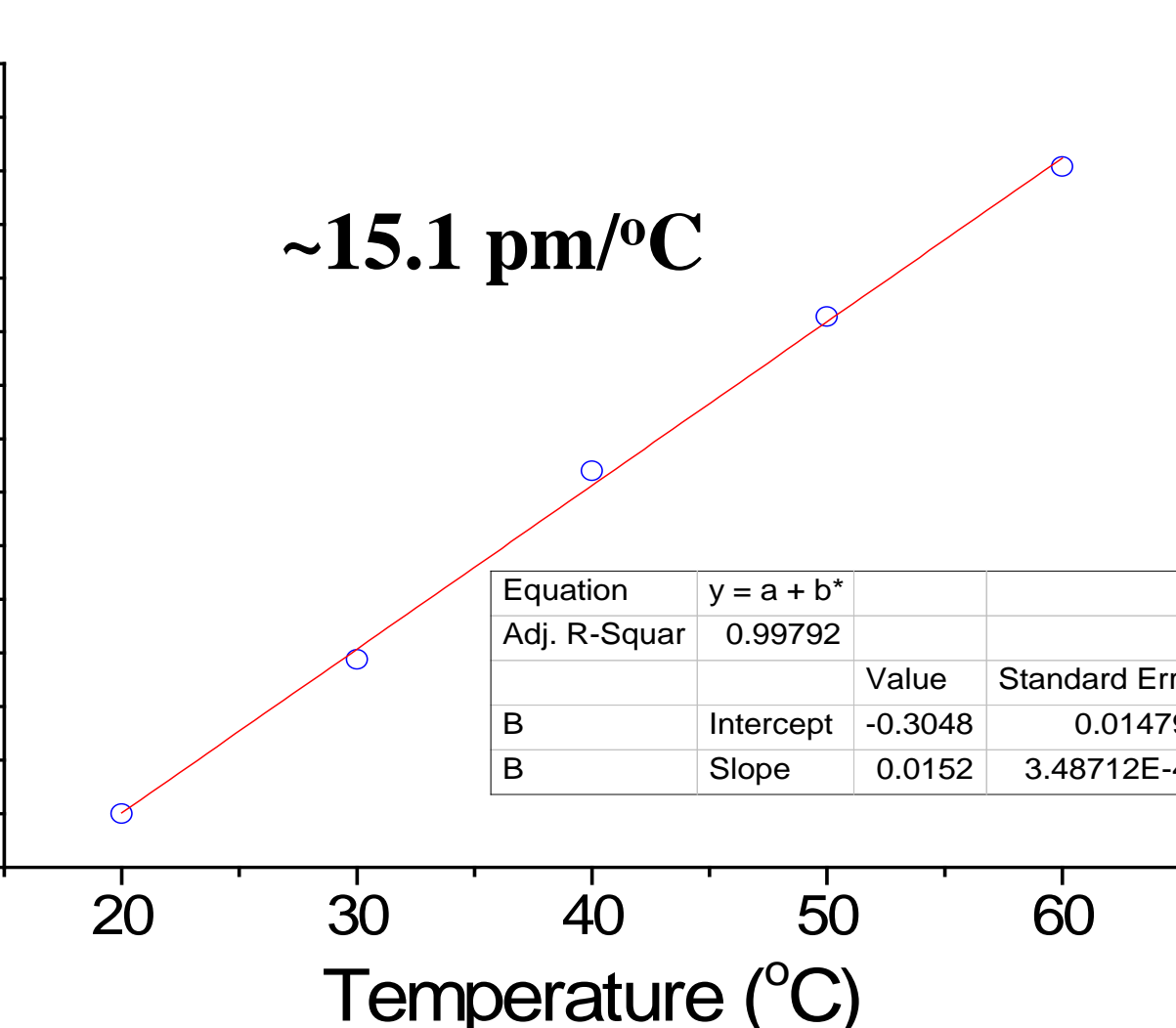
Simulated electric field distribution for a silica microsphere coupled with two tapered fibers in air and polymer



Fabrication process

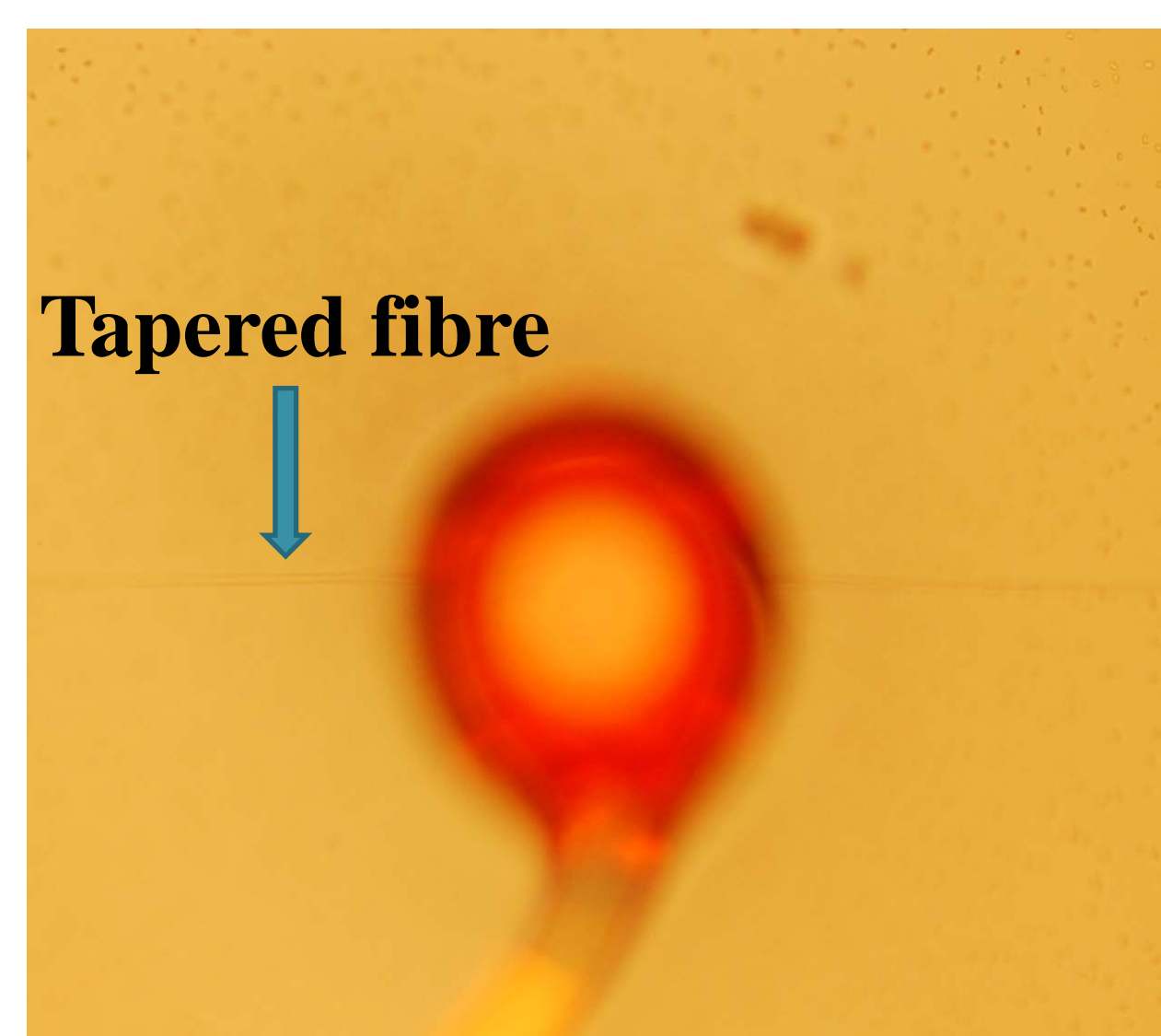


Output spectra from the through and the drop ports

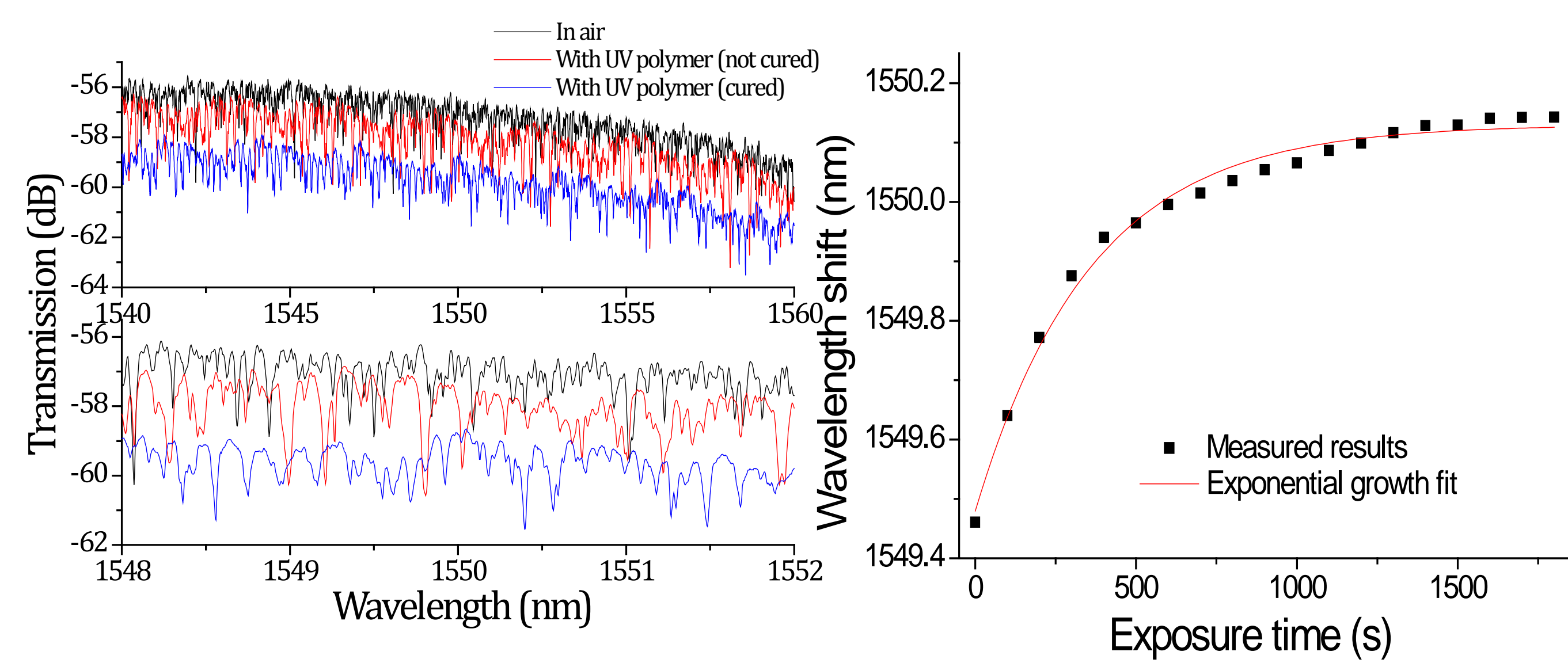


Temperature dependence

Packaged chalcogenide microsphere



Packaged chalcogenide microsphere



Transmission spectra over the wavelength ranges 1540-1560 nm

Peak shift as a function of exposure time

Conclusion

- A compact packaged silica microsphere based add-drop filter with a Q-factor of 0.9×10^5 has been presented.
- The transmission spectral responses of the add and drop channels demonstrate the add-drop potential of the filter for very closely spaced DWDM channels.
- The photosensitivity of the packaged chalcogenide microsphere device with a Q-factor of 1.8×10^5 to a 405 nm laser radiation has been presented.
- These two packaged devices are promising candidates for ideal photonic building-blocks for several telecommunication applications including add-drop filters, highly integrated optical switches, modulators, ultra small optical tunable filters and integrated microlasers.

