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**Whispering Gallery Modes in Highly Hexagonal Symmetric Structures of Three Dimensional SBA-1 Mesoporous Silica** CHIH-WEI CHEN, YANG-FANG CHEN, National Taiwan University — An interesting optical resonant mode, called whispering gallery mode (WGM), has been discovered, inside the three dimensional highly hexagonal symmetry of SBA-1. The hexagonal structure provides a suitable environment for the light wave to circulate around due to multiple total internal reflection at the resonator's boundary and generates the resonant states. By means of the Fourier transform infrared transmittance, we observed the optical WGMs in mesoporous silica SBA-1 decaoctahedron for the first time. Based on the hexagonal total internal reflecting model, the observed eigenmodes can be explained quite well. We also discovered that under the condition of WGMs, the absorption of CO<sub>2</sub> and H<sub>2</sub>O molecules can be greatly enhanced.

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