

Abstract Submitted
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Thermal-closing of holes put in single-graphene sheets of carbon nanotubes depending on its curvatures. MASAKO YUDASAKA, NEC Corporation, JIN MIYAWAKI, Japan Science and Technology Agency (JST), RYOTA YUGE, TAKASUMI KAWAI, NEC Corporation, JING FAN, JST, SUMIO IIJIMA, Meijo University — Holes put in the walls of single-wall carbon nanotubes by oxidation are believed to be closed by heat treatment. We investigated this in detail using single-wall carbon nanohorn (SWNH), a type of single-wall carbon nanotubes. SWNHs are suitable to study this because they have high purities (95%, no metal) and closed structure in the as-grown state, and the holes are easily opened by oxidation. Even numbers and sizes of holes are controllable. The nitrogen adsorption quantities measured at 77K clarified that the holes opened at the tips of tubes were closed easily by the heat treatment at 1473K in Ar, but those in the sidewalls were not, suggesting that the closing easiness depended on the tube curvatures. This was confirmed by the computer simulation. The hole closing kinetics of the tip holes was further investigated by changing the heat-treatment duration, as a result, two types of holes were found: one closed in a couple of minutes and the other in 30 minutes by the heat-treatment a 1473K, which may correspond to the variation of hole-sizes at the tips.

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