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$\begin{array}{c} Preparation \ of \ Mesoporous\\ and \ Meso-macroporous \ SnO_2 \ Powders\\ and \ Application \ to \ H_2 \ Gas \ Sensors \end{array}$

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Mesoporous SnO₂ (mp-SnO₂) and meso-macroporous SnO₂ (m·mp-SnO₂) pellet-type gas sensors were fabricated by the sol-gel method employing SnCl₄·5H₂O as a Sn source. The mesoporous structure was controlled by $C_{20}H_{37}O_7SNa$, while the macroporous structure was controlled by polymethylmethacrylate (PMMA) microspheres. The introduction of macropores by the addition of PMMA microspheres into mp-SnO₂ tends to increase the pore diameter and crystallite size. The large amount of macropores introduced into mp-SnO₂ sensors by the addition of PMMA microspheres in the preparation process significantly increased the resistance of all the sensors. Among all those tested, the mp-SnO₂ sensor with only 5 wt% Sb₂O₅ added exhibited the largest response at 400°C. The 70% response and recovery times could be reduced by the introduction of macropores.

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