

## 概要

固体酸化物形燃料電池 (SOFC) システムの性能予測・コスト評価を基に、将来の電源構成における SOFC の役割と技術開発課題について検討を行った。SOFC システムの発電コストについては、実際の稼働率も考慮した場合において検討を行い、家庭用小型機では 28 円 /kWh から 23 円 /kWh への到達の可能性が示唆され、中・大型機では 14 円 /kWh 程度までのコスト低減の潜在性を有することが示された。国内の電源構成における再生可能エネルギーの割合は今後大きく増加することが予想され、国内の電力システムの様相が変化する中での SOFC の今後の役割と競争力保持に向けた技術開発課題について議論した。すなわち、これまでの家庭用および中・大型機の SOFC システムのコスト削減シナリオに基づき、感度解析による今後の普及拡大に向けた条件と役割 (ベース電源、変動調整、水素製造・貯蔵) について明らかにしたうえで、今後の技術開発課題について検討を行った。

## Summary

The role of solid oxide fuel cell (SOFC) systems in the future electricity mix of Japan and relevant technological challenges were investigated based on the performance and cost analysis of SOFC systems. Considering actual operation conditions such as utilization rate, the electricity costs of the SOFC systems were evaluated. The present analysis suggests that the electricity cost of residential SOFC cogeneration systems can achieve 28-23 JPY/kWh, while middle/large SOFC combined cycle systems have a further cost reduction potential to reduce the electricity cost to ca. 14 JPY/kWh. Since the rate of renewable energy in the future electricity mix of Japan will be increased significantly, the structure of the future electricity mix of Japan will also change drastically. Given the situation, the role of SOFC systems and sharpening of their competitive edge were discussed, i.e., on the basis of the technology scenarios of residential and middle/large SOFC systems, technological issues for developing SOFC systems were considered using a sensitivity analysis with clarifying the conditions of widespread use of SOFC systems and their roles as base load power source, adjustor of the fluctuation of electricity in grids due to a large amount of the induction of renewable energy, and hydrogen production and storage system.