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Invited Plenary Lecture

Presentation Title	New material challenges for polymer electrolyte fuel cells toward the heavy-duty transportation application
Abstract (150 words)	Toward the widespread use of green hydrogen, Polymer Electrolyte Fuel Cells (PEFCs) will be applied in heavy-duty transportation applications such as trucks, buses, trains, and ships. High power density and durability with high efficiency, comparable to those of diesel engines, are targets in future PEFCs, which have been identified as high-priority technical objectives by the New Energy and Industrial Technology Development Organization of Japan. Several-fold higher oxygen reduction reaction activity with more than an order of magnitude higher durability are required of future cathode catalysts. Higher hydrogen oxidation reaction activity anode catalysts with low H_2O_2 generation are also prospective materials for these applications. Green hydrogen electrolysers are also being developed while addressing important catalyst and membrane issues. The Hydrogen and Fuel Cell Nanomaterials Center of the University of Yamanashi is actively developing new cathode and anode catalysts toward the applications of PEFCs and electrolysers, as will be discussed in detail.
Biographical Sketch (150 words)	Professor Katsuyoshi Kakinuma received his PhD from the Tokyo University of Science, Japan in 1998. He is currently a Professor of the Clean Energy Research Center and Manager of the Ceramics Division of the Hydrogen and Fuel Cell Nanomaterials Center, University of Yamanashi, Japan. He is a member of the Next Generation Fuel Cell Vehicles Consortium in the New Energy and Industrial Technology Development Organization (NEDO), Japan, Committee Chief of the Fuel Cell Division of the Electrochemical Society of Japan, and a committee member of the Fuel Cell Division of the Electrochemical Society. He also oversees the Editorial Board of the Journal “Denki Kagaku” (Electrochemical Society of Japan) as Deputy Editor-in-Chief. His research interests include fuel cells (catalysts, analysis) and electrolysers (catalysts), His awards include the Young Researcher Award of the Electrochemical Society of Japan (Sano Award) in 2005, and the Research Award of the FCDIC of Japan, among others.