

# **New approach removes sulfur from military-grade fuel**

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The military needs to get the sulfur out of its fuel, in order to use the fuel to produce hydrogen for fuel cell use in the field. Fuel cells can generate the electricity necessary to power electronic gadgets and facilitate communications, while avoiding use of generators that are noisy and create heat signatures.

Researchers at Pacific Northwest National Laboratory have developed a compact and rugged microchannel distillation unit to create a light fraction of JP-8, the standard military fuel. The JP-8 light fraction is then reacted in a catalytic process called hydrodesulfurization, in order to remove the sulfur from the fuel. Conventional technology utilizes hydrogen as the co-reactant with JP-8 to power the process, but it is not available in the field. Syngas can be generated by steam reforming of the purified fuel.

Most of the syngas is further purified for use by the fuel cell, but a fraction of the syngas is diverted to the hydrodesulfurization unit. The use of syngas creates some challenges, but it appears that they have been mostly overcome in the PNNL process, and syngas performs almost as well as pure hydrogen.

Gas phase operation of the process allows significant increase in throughput and decrease in operating pressure compared with conventional technology. Residual sulfur concentration in the hydrodesulfurized fuel below five parts per million has been obtained.

Source: Pacific Northwest National Laboratory

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