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PEROVSKITE-BASED MATERIALS AND THEIR POTENTIAL APPLICATIONS

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Despite shifting from coal to renewable energy sources, global coal consumption is still reaching new records. In the foreseeable future, coal will still have a significant role in global energetics. In the necessity of mitigate effects of greenhouse gases emission to atmosphere, new, more environmental, friendly methods combination with the necessity of mitigating the effects of greenhouse gas emissions to the atmosphere, new, more environmentally friendly methods of fuel combustion are needed. One such method is the Chemical Looping Combustion of solid fuels. In this technology, a system of two reactors is applied, between which a material called an oxygen carrier is circulating. That approach allows the combustion of fuels without the presence of atmospheric air. All oxygen necessary for a combustion process is delivered to a fuel by an oxygen carrier. Therefore, further sequestration of carbon dioxide from exhaust fumes is largely simplified. As oxygen carriers, various materials can be applied: naturally occurring ores or synthetic substances designed for that purpose. Some promising materials for this application are perovskites. Perovskite-structure materials can be easily modified, which allows to design new materials of desired properties, for different applications.

In the presented research, Polish hard coal Janina was combusted in the CLC process using iron-based perovskites obtained by solid state synthesis. The experiment was conducted using thermogravimetric equipment coupled with a quadrupole mass spectrometer for real-time fume gas analysis.

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