

SUCCESS STORY

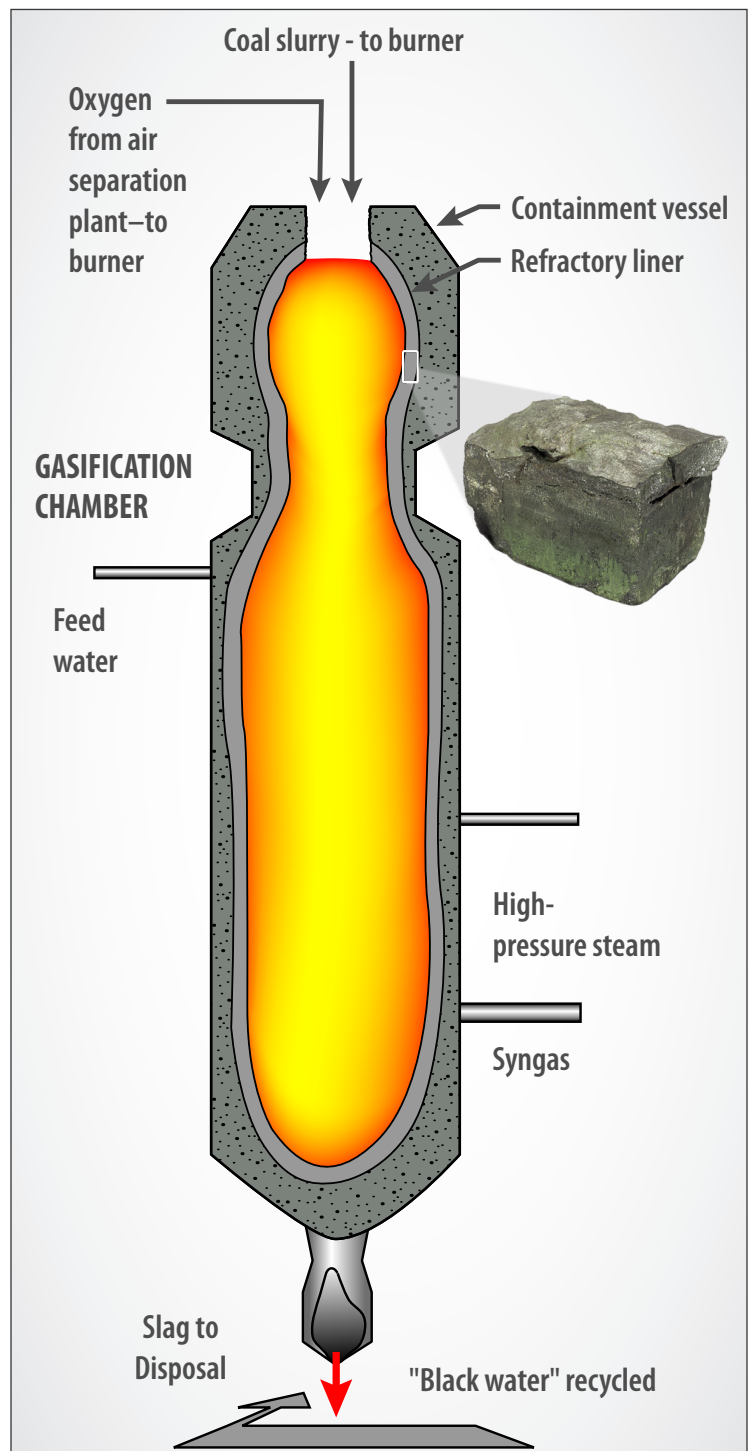
REFRACTORY LINING MATERIAL IMPROVES GASIFIER PERFORMANCE

Refractory materials are used to line the interior of slagging gasifiers, where a carbon-based feedstock such as coal, petcoke, and/or biomass, is converted at high temperatures in an oxygen-deficient environment to produce synthesis gas, which can be used in power generation.

The refractory lining is necessary to protect the steel shell of the gasification chamber from the harsh environment occurring during gasification. Refractory materials that can withstand severe operating conditions for long periods of time are needed to ensure the gasification process is continuous, efficient, and reliable. High chrome oxide refractory materials traditionally used as gasifier linings fail in 3 to 24 months, requiring a gasifier to be completely shut down for material replacement. The poor service life, replacement time, and costs associated with the gasifier shutdown have been major drawbacks, reducing on-line gasifier availability and reliability, as well as limiting commercial deployment of gasification.

To address this issue, NETL researchers developed a phosphate-modified high-chrome oxide material that increases service life up to 50 percent over traditional liner materials. Additionally, the new refractory material reduces operating costs by improving on-line availability. NETL collaborated in this effort with Pittsburgh-based Harbinson-Walker Refractories to produce and evaluate the novel refractory lining. Harbinson-Walker Refractories subsequently licensed the refractory for commercialization as AUREX™95P, which is marketed as a liner material for commercial gasifiers. Since introduction in 2007, Harbinson-Walker has experienced steady sales growth and AUREX 95P, a material which has become the industry standard for high wear areas in slagging coal gasifiers.

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The continued advancement of gasification technology requires new and improved refractory materials, such as AUREX 95P, that will increase the cycle time between maintenance shutdowns, as well as increase the gasifier's reliability and availability. The AUREX 95P represents the most significant improvement in gasifier refractories in over 30 years and will help eliminate roadblocks that limit the use of gasification technology for electric power and other product production.



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NETL's accomplished materials research groups tackle the toughest of challenges daily as they investigate the theoretical and fundamental makeup of fossil energy and renewable energy systems. Addressing fundamental mechanisms and processes, the materials labs are capable of melting, casting, and fabricating up to one ton of materials; completely characterizing the physical properties of materials; and addressing the waste and by-product issues of materials processes.