WEDNESDAY, AUGUST 25, 2004, A.M.

SESSION 47: FIFTH INTERNATIONAL SYMPOSIUM ON WASTE PROCESSING AND RECYCLING IN MINERAL AND METALLURGICAL INDUSTRIES

BYPRODUCT PROCESSING

Sponsors: Hydrometallurgy, Non-Ferrous Pyrometallurgy, Iron and Steel Sections and Environment Committee of the Metallurgical Society of CIM and the Environmental Society of CIM

Room: Chedoke A

Chairmen: J.A. KOZINSKI, McGill University, Montréal, Québec, Canada, and
L. SURGES, Noranda Inc., Toronto, Ontario, Canada

PAPER 41.1 — 9:00

RECOVERY OF VANADIUM FROM OIL SANDS FLY ASH USING POTASSIUM AND CALCIUM REAGENTS.

P. HOLLOWAY and T. ETSELL, University of Alberta, Edmonton, Alberta, Canada

Vanadium is concentrated in the fly ash which is produced as a solid waste from oil sands operations in northern Alberta and vanadium recovery from this fly ash has been the subject of several research studies at the University of Alberta. Though a conceptual process flowsheet using sodium chloride as a roasting reagent has been developed, recent studies look at the potential for using potassium or calcium compounds as alternative reagents for roasting Suncor fly ash to recover vanadium. The impact of these reagents on the vanadium recovery flowsheet and product and byproduct saleability and is also discussed.

PAPER 47.2 — 9:25

VANADIUM RECOVERY FROM CONVERTER SLAG.

L. YU, Y. DONG and L. LI, Anhui University of Technology, Maanshan, China

Converter slag has become an important secondary raw material. Consequently, vanadium bearing converter slag of Magang and vanadium distribution in slag is of great interest. Solidified converter slags are made up of three main mineral components: dicalcium silicate, calcium ferrite and wustite. Vanadium in modified slow cooling down converter slag of Magang is found mainly concentrated in a separate mineral phase. The mineral phase with high content of vanadium (24%, wt, V_2O_5), concentrating 83% of vanadium, can be separated from the slag for economical vanadium recovery. Some characters of the mineral phase were discussed comparing with dicalcium silicate, one of the typical mineral phases in converter slag studied well.

PAPER 47.3 — 9:50

LARGE STEELMAKING SLAG BLOCKS USING A NEW CARBONATION PROCESS.

Y. MIYATA, K. WATANABE, T. ISOO, K. OYAMADA and T. TAKAHASHI, JFE Steel Corporation, Fukuyama, Japan

Large porous slag blocks were produced by carbonation of steel slag with the optimum amount of water, and supplying CO_2 deep into the slag powder compacted in the mold. The development of the blocks has great potential to solve the utilization of the slag, for example by providing carbonated large blocks for use in artificial fish reef and marine plant cultivating beds. This paper overviews the carbonation reaction and the new process for producing large slag blocks, and discusses their utilization in past and recent years.

COFFEE BREAK — 10:15 - 10:40

PAPER 47.4 — 10:40

PROCESS FOR THE COMPLETE UTILIZATION OF OIL SANDS FLY ASH.

P. HOLLOWAY and T. ETSELL, University of Alberta, Edmonton, Alberta, Canada

The fly ash produced by oil sands operations in northern Alberta represents a large, high-grade, potential resource for vanadium production in Canada. After extensive batch testing at the University of Alberta, a conceptual process flowsheet for the recovery of vanadium from oil sands fly ash has been developed. The various unit operations, including roasting, leaching, precipitation and byproduct recovery, will be discussed with particular emphasis on the treatment of waste streams to maximize the sources of potential secondary revenue and minimize the environmental impact from this process.

PAPER 47.5 — 11:05

PRODUCTION OF ZINC OXIDE FROM ZINC ORE CONCENTRATION RESIDUES.

S.M. TAGHAVI and M. HALALI, Sharif University, Tehran, Iran

This paper describes investigations on zinc oxide production from zinc ores concentration residues and also the effect of temperature, time and depth of bed on reduction of waste materials reduction. The results show a significant increase of the reduction percent as a function of time and temperature experiments. Meanwhile, with increasing in depth of bed, reduction percent decreases. Maximum zinc oxide percent in products was 93.5%.

PAPER 47.6 — 11:30

FIRING OF WOODWASTE-DERIVED OIL FUEL IN INDUSTRIAL ROTARY KILN OPERATIONS.

Y-H. LI, A.P. WATKINSON and P.V. BARR, University of British Columbia, Vancouver, British Columbia, Canada

BioOil produced from woodwastes via pyrolysis is a potential fuel for lime kilns in the pulp and paper and other industries. In North America it is common to use fossil fuels to fire rotary lime kilns at energy consumption levels of 5-10 GJ/tonne CaO. This investigation was undertaken to make a direct comparison of the performance of a pilot lime kiln when fuelled with natural gas and with BioOil supplied by Dynamotive Technologies Ltd. In the kiln, limestone undergoes calcination at high temperature to produce lime (CaO). Results from heat release trials, and limestone calcination experiments showed that axial temperatures of gases, solids and kiln refractory walls were similar using BioOil and natural gas at the saming firing rates. The product lime had essentially the same extent of calcination using the two fuels. The responses of percent calcination to changes in fuel firing rate and limestone feed rate were similar with BioOil and with natural gas such that the percentage calcination was the same with both fuels at equivalent values of the specific firing rate based on lower heating values. Scanning electron microscopy and slaking reactivity tests revealed no differences between lime produced when BioOil or natural gas were used as the fuel. It was concluded that in the pilot scale lime kiln fed with dry limestone the two fuels were equivalent in terms of, power consumption in EW circuit was greatly reduced.