Erratum to: Estimation of Sintering Kinetics of Magnetite Pellet Using Optical Dilatometer

T.K. SANDEEP KUMAR, NEELAKANTAN NURNI VISWANATHAN,
HESHAM M. AHMED, CHARLOTTE ANDERSSON, and B. BJÖRKMAN

DOI: 10.1007/s11663-016-0843-2

© The Minerals, Metals & Materials Society and ASM International 2016

**Erratum to: METALLURGICAL AND MATERIALS
TRANSACTIONS B,
VOL. 47B, PP. 309–319, 2016,
DOI: 10.1007/S11663-015-0505-9**

AUTHORS have used a new way for measuring bulk volume based on the image (pixel) analysis named as Light Table Imaging (LTI), and subsequently bulk densities and porosities. Authors lately found that there was a slight error in calibrating the scale (known distance) to pixel measurement and understand the need to communicate the error and subsequent corrections.

After correcting the calibration scale appropriately, the corresponding corrections have been implemented to evaluate the values of bulk volume, bulk density, porosity, sintering ratio and further kinetic parameters for all the pellets used in the study. The corrections have only changes the absolute values and does not affected or changed the understanding, outcome and conclusions of the study. Therefore, it is requested to incorporate the changes – Figures and Table by the corrected ones as mentioned below.

T.K. SANDEEP KUMAR, Doctorate Student, is with the Department of Civil, Environmental and Natural Resources (SBN), Lulea University of Technology (LTU), Lulea, 97187 Sweden Contact e-mail: kamesh.sandeep@ltu.se NEELAKANTAN NURNI VISWANATHAN, Visiting Professor, is with the Department of Civil, Environmental and Natural Resources (SBN), Lulea University of Technology (LTU) and also Professor, with the Department of Metallurgical Engineering & Materials Science, Indian Institute of Technology Bombay (IITB), Mumbai 400076, India. HESHAM M. AHMED, Assistant Professor, is with the Department of Civil, Environmental and Natural Resources (SBN), Lulea University of Technology (LTU) and also with the Central Metallurgical Research & Development Institute (CMRDI), Cairo, Egypt. CHARLOTTE ANDERSSON, Specialist/Senior Researcher - Oxidation Metallurgy Research & Development, is with the Luossavaara-Kiirunavara Aktiebolag (LKAB), Malmberget, Gällivare, 98381 Sweden. B. BJÖRKMAN, Emeritus Professor, is with the Department of Civil, Environmental and Natural Resources (SBN), Lulea University of Technology (LTU).

The online version of the original article can be found under doi: [10.1007/s11663-015-0505-9](https://doi.org/10.1007/s11663-015-0505-9).

Article published online October 26, 2016.

LIST OF CORRECTIONS

1. Page 309, Abstract, Line 13/14: “...two activation energies—477 kJ/mole [1173 K to 1373 K (900 °C to 1100 °C)] and 148 kJ/mole [1373 K to 1623 K (1100 °C to 1350 °C)]...”

should be replaced by

“...two activation energies—451 kJ/mole [1173 K to 1523 K (900 °C to 1250 °C)] and 162 kJ/mole [1523 K to 1623 K (1250 °C to 1350 °C)]...”

2. Figures which should be replaced with the corresponding ones as shown below:
 - i. Page 314, Fig. 8
 - ii. Page 315, Fig. 9
 - iii. Page 315, Fig. 10
 - iv. Page 316, Fig. 11
 - v. Page 316, Fig. 12
 - vi. Page 317, Fig. 13

Fig. 8—Sintering ratio for magnetite pellets during sintering at different temperatures.

Fig. 9—Depiction of parameters of power law from sintering ratio plots with respect to time.

Fig. 10—Time exponent ‘*n*’ estimated from the slope of curves, for magnetite pellets sintered at different temperatures.

3. Page 315, Line 32: “The value of ‘*n*’ varies from 0.45 to 0.15 in the range...” should be replaced by “The value of ‘*n*’ varies from 0.45 to 0.19 in the range...”.
4. Page 315, Equation [8] should be replaced by the following equation

$$n = -3.63 \times 10^{-4}T + 0.813$$

5. Page 316, Table III should be replaced by the corresponding table mentioned here.
6. Page 318, Conclusions, Line 10:

“...the value of ‘*n*’ varies from 0.45 to 0.15 with the increase in temperature. The two activation energy values estimated for the sintering of magnetite pellets are

Fig. 11—Variation of time exponent ‘*n*’ for pellets exposed to different sintering temperatures.

Table III. Kinetic Parameters for Sintering of Magnetite Pellets

Sintering Temp. [K (°C)]	<i>n</i>	<i>K</i> (x 10 ⁻³) (s ⁻¹)	<i>t</i> * (s)	Activation Energy (kJ/mole)	Pre-exponential Factor (K/s)
1173 (900)	0.38	0.8	703.13	<i>Q</i> ₂ = 451 kJ/mole (1173 K – 1523 K) (900 °C – 1250 °C)	<i>K</i> ₂ = 3.20 X 10 ¹⁴ (1173 K – 1523 K) (900 °C – 1250 °C)
1223 (950)	0.31	2.5	837.99		
1248 (975)	0.28	4.2	143.59		
1273 (1000)	0.45	1.7	866.39		
1298 (1025)	0.26	10.6	246.81		
1323 (1050)	0.36	5.3	544.61	<i>Q</i> ₁ = 162 kJ/mole (1523 – 1623 K) (1250 °C – 1350 °C)	<i>K</i> ₁ = 5.57 X 10 ⁴ (1523 K – 1623 K) (1250 °C – 1350 °C)
1373 (1100)	0.35	10.6	428.56		
1423 (1150)	0.32	23.7	387.71		
1473 (1200)	0.28	42.3	315.34		
1523 (1250)	0.26	73.1	507.45		
1573 (1300)	0.25	78.0	510.25		
1623 (1350)	0.19	206.5	234.14

Fig. 12—Activation energies and pre-exponential factors for the sintering of magnetite pellets.

477 kJ/mol and 148 kJ/mol, respectively, at lower temperatures [1173 K to 1373 K (900 °C to 1100 °C)] and higher temperatures [1373 K to 1623 K (1100 °C to 1350 °C)]...

should be replaced by

“...the value of ‘*n*’ varies from 0.45 to 0.19 with the increase in temperature. The two activation energy values estimated for the sintering of magnetite pellets are 451 kJ/mol and 162 kJ/mol, respectively, at lower temperatures [1173 K to 1523 K (900 °C to 1250 °C)] and higher temperatures [1523 K to 1623 K (1250 °C to 1350 °C)]...”.

Fig. 13—Predicted and estimated sintering ratios for pellets exposed to (a) different heating rates up to 1573 K (1300 °C), and (b) different temperatures at same heating rate of 30 K/min (30 °C/min).