Fig. 11. Activation energies determined after Šatava⁹.

TABLE 7

ACTIVATION ENERGIES FROM UNISOTHERMAL DATA

Preparation No.	Crucible diameter (mm)	Sample (mg)	Activation energy ^a (kcal mol ⁻¹)	Pre-exponential factor ^a
1	16	5	28 ± 2 (30.0 ± 4.9)	5.9 · 10 ¹⁰ (7.0 · 10 ¹²)
1	16	52	30 ± 2 (25.8 ± 4.1)	9.6 · 10 ¹⁰ (4.1 · 10 ⁹)
2	16	5	26 ± 2	1.1 · 10 ¹⁰
2	16	52	28 ± 2	1.2 · 10 ¹⁰
3	16	3.5	26 ± 2 (30.0 ± 10.9)	1.6 · 10 ¹¹ (1.6 · 10 ¹⁴)
3	16	42	20 ± 2	4.5 · 10 ⁶
4	16	5	30 ± 2 (33.6 ± 9.7)	9.2 · 10 ¹² (8.1 · 10 ¹⁵)
4	16	52	20 ± 2	1.6 · 10 ⁶

^aIn brackets figures from Table 6 for comparison.

TABLE 8

PARTICLE SIZE OF γ -Fe₂O₃ FROM X-RAY PROFILE ANALYSIS

γ -Fe ₂ O ₃	Crystallite size from profile of reflection			
	220	113	400	440
From preparation 1	27 Å	32 Å	72 Å	71 Å
From preparation 3	20 Å	29 Å	42 Å	43 Å
From preparation 4	17 Å	27 Å	34 Å	35 Å

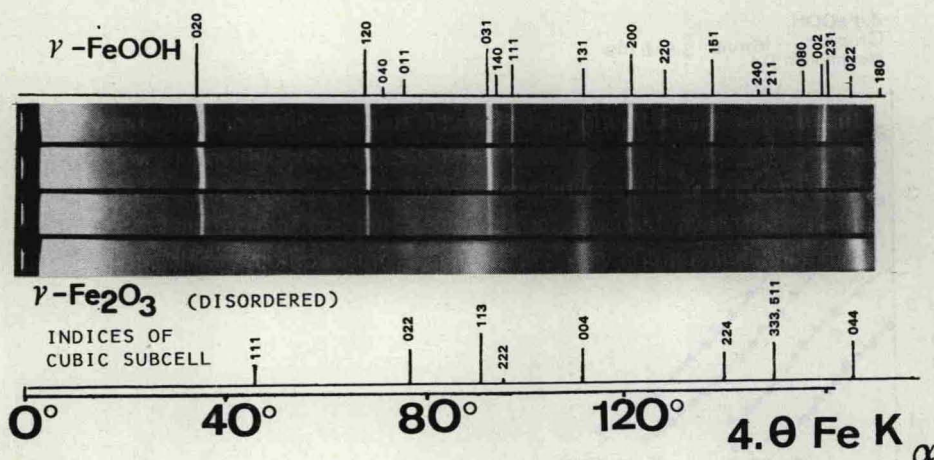


Fig. 12. Guinier patterns of four samples of partly decomposed γ -FeOOH (preparation 1) produced in vacuo at 115°C. From above: Fractional decomposition ca. 25, 50, 74 and 83%.

8. BET surface

In order to check the mentioned, astonishingly low crystallite size, BET measurements of the specific surface made on the Cahn balance directly after decomposition (without breaking the vacuum) as well as those from samples decomposed in vacuo in a tube furnace may be compared in Table 9. The data from BET surface determinations have two features worthwhile pointing out. First, the particle sizes

TABLE 9

PARTICLE SIZE (Å) (CUBE EDGE) OF γ -Fe₂O₃, FROM BET MEASUREMENTS

γ -Fe ₂ O ₃	History (decomposition at 150–200°C)		
	Produced on Cahn balance without breaking vacuum	Produced in tube furnace in vacuo, transferred to Cahn balance via air	Produced in tube furnace, from x-ray line profile, for comparison
From preparation 1	87	167	72
From preparation 2	97	—	—
From preparation 3	69	88	42
From preparation 4	81	122	35

differ by a factor no less than two, depending on whether or not the samples have been in contact with room air (i.e., moisture). Secondly, there is a fairly good agreement between values of column 1 and 3; i.e., whenever the BET measurement has been done without breaking the vacuum, the resulting particle size is within an order of magnitude comparable to the x-ray crystallite size.