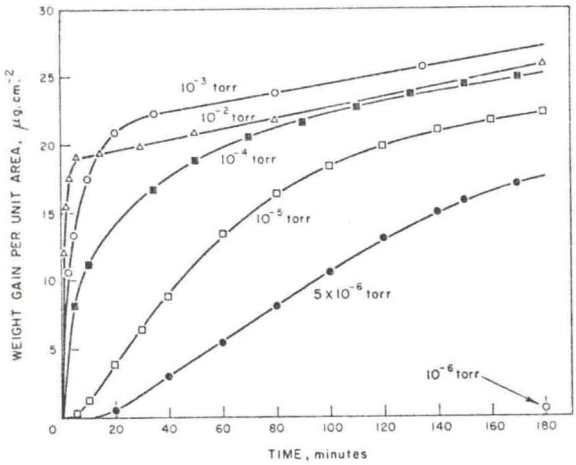


Fig. 3. Effect of oxygen pressure on the oxidation of Ferrovac E iron at 350°C.

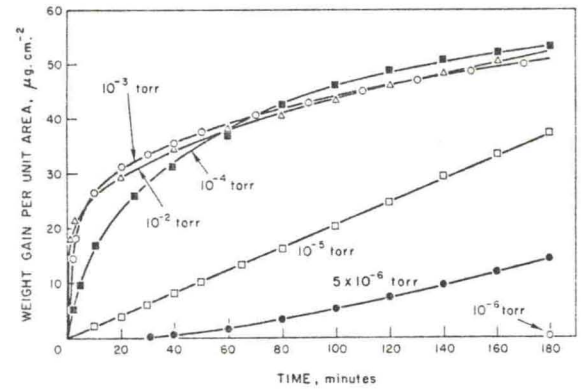


Fig. 4. Effect of oxygen pressure on the oxidation of Ferrovac E iron at 400°C.

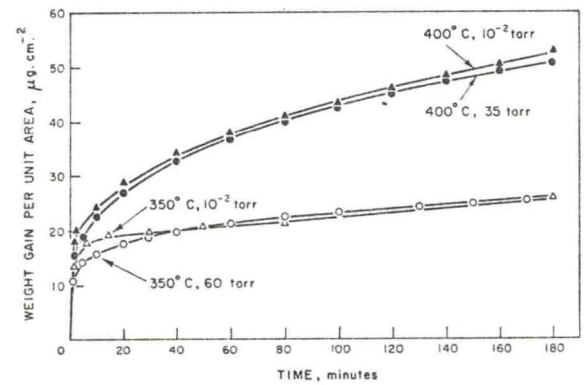


Fig. 5. High pressure oxidation of Ferrovac E iron at 350° and 400°C.

creases with increasing oxygen pressure in the range $10^{-4}$ to 35 or 60 Torr of oxygen, the weight gain after 3 hr is essentially pressure independent, as summarized in Table I. After 3 hr oxidation at 350°C, the average weight gain for this pressure range is about 26 $\mu$g cm$^{-2}$, compared with a value of about 52 $\mu$g cm$^{-2}$ at 400°C. An induction period is observed for oxidations at 5 x $10^{-6}$ Torr at both 350° and 400°C.

Table I. Weight gain per unit area after 3 hr oxidation

| Pressure, Torr | Weight gain ($\mu$g cm$^{-2}$) after 3 hr (a) 350°C | (b) 400°C |
|---|---|---|
| $10^{-6}$ | ~0.5 | ~0.1 |
| 5 x $10^{-6}$ | 17.0 | 14.2 |
| $10^{-5}$ | 22.6 | 37.0 |
| $10^{-4}$ | 24.8 | 53.2 |
| $10^{-3}$ | 27.3 | 51.0 |
| $10^{-2}$ | 25.8 | 53.0 |
| 35 | — | 50.9 |
| 60 | 25.1, 25.0, 25.8 | — |

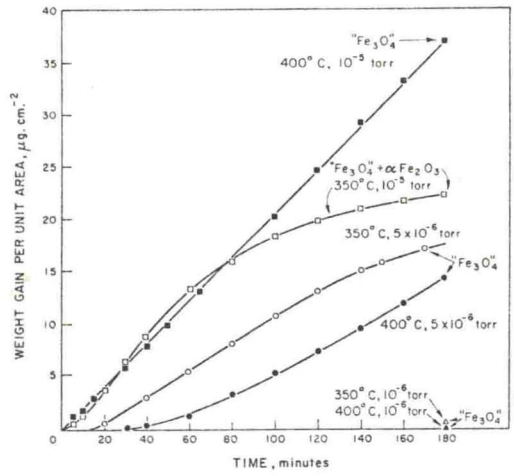


Fig. 6. Comparison of the low pressure oxidation of Ferrovac E iron at 350° and 400°C.

The weight gains after 3 hr of oxidation at $10^{-6}$ Torr were obtained by difference from the weight of the specimen before and after oxidation, as determined by the Mettler analytical microbalance, (taking into account the removal of the oxide film resulting from the electropolishing), the Cahn electrobalance being not sufficiently stable to identify this small weight change.

The kinetic data from oxidations at $10^{-4}$, $10^{-3}$, and $10^{-2}$ Torr oxygen at 350° and 400°C is plotted in a parabolic manner in Fig. 7 and 8, respectively. Another parabolic plot of the data from the oxidation at 35

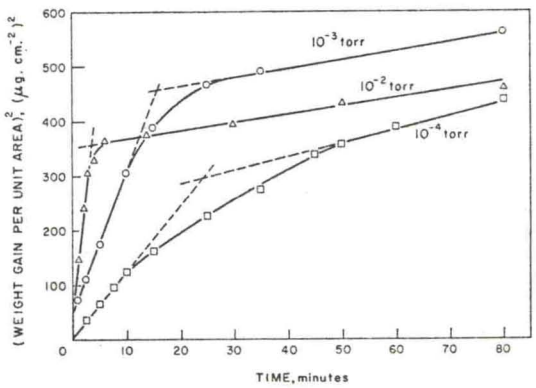


Fig. 7. Parabolic plot of data from the oxidation at 350°C; $10^{-4}$, $10^{-3}$, and $10^{-2}$ Torr oxygen pressure.

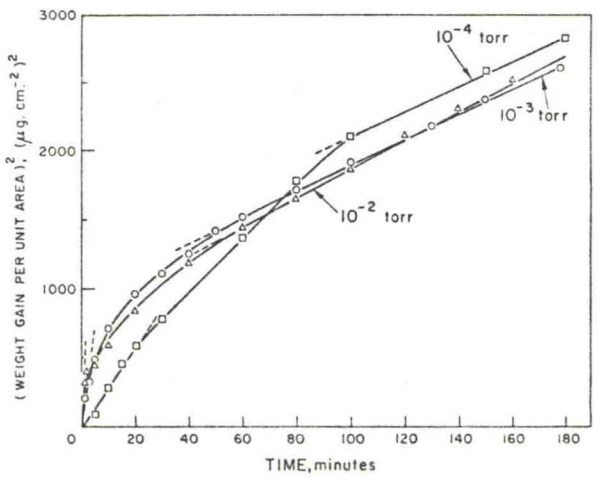


Fig. 8. Parabolic plot of data from the oxidation at 400°C; $10^{-4}$, $10^{-3}$, and $10^{-2}$ Torr oxygen pressure.