Evolution of Sintering of Particles that Compose Iron Ore Agglomerates.

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Abstract:
The increasing demand for new technologies in the ironmaking/steelmaking field has been motivating several studies towards pelletizing process improvement. Within this context, evaluate the reduction of iron ore pellets using the dilatometer technique constitutes a promising approach for optimizing this process. This paper aims the metallurgical characterization through the sintering of particles in iron ore pellets. With this purpose, some experimental procedures are of concern as follows. Firstly, the volume growth of the pellets is measured using a dilatometer, which heats the samples up at 30 K/min until high temperatures about 1473 K and an isotherm at different times, 5, 7, 10 and 12 minutes have been done. Then, each sample is cooled back to room temperature and undergoes a microstructural characterization, with the aid of a scanning electron microscope. At last, the density of the pellets is evaluated, using an Arquimedes Principle and consequently the porosity of the agglomerates. The results indicate the sintering progress of the particles that comprise the pellets as well as reduction the porosity. This behavior is due to the fact that the heat arising from gas induces the liquid phase formation and involves the agglomerate particles aiding in the sintering process.