China’s polar activities are typically explained as emerging from national interests in scientific research, natural resources, shipping, climate change, and global governance. Yet few academic or political legitimations of China’s Arctic activities tie them to the country’s metallurgical supply and demand. This paper fills that gap through analysis of the impacts of and responses to China’s expanding iron and steel industries in the Arctic. Using a global commodity chain framework with emphasis on materiality and relationality, it considers how the extractive impacts of iron mining and the intensive impacts of the development of steel-based infrastructure are often realized in the same space. The combination of these processes creates a “double frontier” in spaces like the Arctic, which serves as an extractive frontier from which raw materials are imported and an intensive frontier to which their value-added outputs are exported. To analyze these processes, this paper explores four vignettes that address first, the spatial expansion of China’s iron and steel sectors, second, the restarting of iron ore production in northern Quebec, third, the Chinese-funded construction of infrastructure across the Arctic, and fourth, the abstraction of the Chinese iron ore industry through environmental and financial measures that improve the position of the country’s cities while exacerbating the socioeconomic and environmental impacts of its metallurgical sectors in frontiers. Attention to the material substances driving China’s economic expansion demonstrates how the country’s globe-spanning iron and steel industries are reworking and restructuring social and ecological processes in the north while reproducing the region’s marginalization.