

A method of processing a metal alloy includes heating to a temperature in a working temperature range from a recrystallization temperature of the metal alloy to a temperature less than an incipient melting temperature of the metal alloy, and working the alloy. At least a surface region is heated to a temperature in the working temperature range. The surface region is maintained within the working temperature range for a period of time to recrystallize the surface region of the metal alloy, and the alloy is cooled so as to minimize grain growth. In embodiments including superaustenitic and austenitic stainless steel alloys, process temperatures and times are selected to avoid precipitation of deleterious intermetallic sigma-phase. A hot worked superaustenitic stainless steel alloy having equiaxed grains throughout the alloy is also disclosed.