Chondrules are believed to have formed by incomplete melting of fine-grained dustball precursors during localized, brief, repetitive heating events, possibly by shock waves, in the protoplanetary disk in the early solar nebula [1]. We recently challenged this conventional thinking by the observation that some Mg-rich olivines (Fo > 95) are present as coarse-grained aggregates with granoblastic textures. In order to produce these textures, conditions allowing sintering and prolonged high-temperature (> 1000°C) annealing are required [2]. These conditions cannot be reached during brief heating events but are easily reached in the interior of a planetesimal. Mg-rich olivines within coarse-grained aggregates are thus relict grains which survived to chondrule melting. This feature were further supported by the oxygen isotopic compositions which allow to identify a given Mg-rich olivine (amongst the surrounding magmatic phases: glass and pyroxene) as a relict [3], even when the granoblastic texture has been obscured by partial dissolution during chondrule melting.

Owing to a survey of the oxygen isotopic compositions of Mg-rich olivines of type I chondrules from carbonaceous and ordinary chondrites, we explore in this paper the constraints that the variability in the oxygen isotopic composition of the Mg-rich olivine in type I chondrules can bring on their putative parent planetesimals.