INTRODUCTION

The chemical composition of chondrules and matrix is complementary in carbonaceous chondrites (e.g.,[1,2,3]. For example, chondrules are Mg-rich and Fe-poor and matrix is Si- and Fe-rich. Also refractory refractory element ratios, Ca/Al and Ti/Al are often complementary [e.g. 1,3]. However, bulk chondrites have in all cases CI chondritic element ratios. These complementarities are best explained by a process in which chondrules and matrix formed from the same elemental reservoir in the protoplanetary disk.

CM chondrites have about 30 vol.% chondrules and 70 vol.% matrix. Chondrules consist of abundant forsteritic olivine, low-Ca pyroxene, and a Al,Ca-rich mesostasis. We analysed the composition of bulk chondrules, matrix, fine grained rims around chondrules (fgr) and bulk meteorite of Jbilet Winselwan (JW), a recently found CM2 chondrite [4]. JW is mostly devoid of significant aqueous alteration [5].

RESULTS

Petrography

All studied chondrules are porphyritic, mainly POP. Most chondrules (>70 %) are mineralogically zoned, with olivine in the core and low Ca-pyroxene at the rim [cf. 6].

Bulk meteorite composition

Major and minor elements are in good agreement with data from other CM. Except for slight depletion of Na and K, and depletion of Ca. The cause of the depletions is yet unclear.

DISCUSSION

• JW is a primitive CM chondritic breccia with comparatively little terrestrial alteration. Chondrules in JW are often mineralogically zoned with olivine in the center and low Ca-pyroxene at the rim. This indicates open system conditions [6].
• So far there only exist bulk chondrule data in combination with matrix data from one CM meteorite [2].
• In JW chondrules and matrix are complementary with regard to Mg/Si, Fe/Mg, Al/Ti ratios.
• Especially the complementary distribution from the two refractory elements Al and Ti with the well defined CI chondritic bulk meteorite composition of JW for Al/Ti can not be explained from any parent body processes, but from the preferred incorporation of Ti bearing phases (e.g. perovskite) in chondrules or chondrule precursors in the solar nebular.
• All findings hint to a common formation of chondrules and matrix from a single chondritic reservoir