Cooling history of L chondrites.

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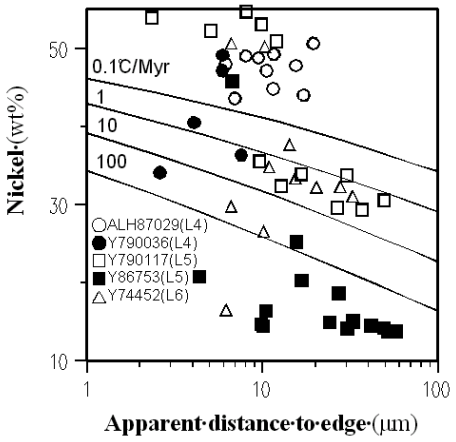
We applied olivine-spinel geothermometry (Fabliés, 1979) and metallographic cooling rate estimates (Willis and Goldstein, 1981) to equilibrated L chondrites in an attempt to elucidate the structure and thermal history of their parent body. If the parent body of the L chondrites was heated by internal sources (e.g., decay of ^{26}Al), it should have an onion-shell structure in which metamorphism increases with burial depth (Lee., et al., 1976; Miyamoto et al., 1981). However, most equilibrated L chondrites we examined have similar olivine-spinel equilibration temperatures (600-700°C). Metallographic cooling rates range from <0.1°C/Myr to >100°C/Myr with no correlation between cooling rates and petrologic types (Fig.). Therefore, the structure and history of this body is more complex than implied by the onion-shell model. Because Y86753 (L4) exhibits a high olivine-spinel equilibration temperature (690-740°C) and a high metallographic cooling rate (~1000°C/Myr), it probably was excavated from the hot interior of the body and rapidly cooled. Hence, in contrast to the H chondrite parent body (Trieloff et al., 2003), the L chondrite parent body probably suffered a disruptive collision at an early stage, while thermal metamorphism was still active.



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Speciation of mercury in river water near Idrija mercury mine, Slovenia

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In order to estimate the impact of mercury released from the mine, the chemical forms of mercury in river water was investigated. Water, soil and sediment samples were collected from three locations of river, Idrijca : Pred Idrija (St.1, upper reaches of the mine); Pod dimnicom (St.2, the point nearest the mine); Idrija Spodnja (St.3, the lower reaches of the mine). Mercury in air was also collected on porous gold collector.

T-Hg in water was determined by CVAAS. MeHg in water was derivatized into volatile alkyl form and detected by CVAFS after a GC separation. Volatile form of mercury (Hg^0) was trapped on Tenax column by babbling the water sample with N_2 gas and measured by CVAFS. T-Hg in soil and sediment was determined by CVAAS after wet digestion at 230°C using a H_2SO_4-HNO_3-$HClO_4$ mixture.

T-Hg in soil and sediment ranged 7.5-5620 mg/kg and 1.6-22100 mg/kg, respectively (dry basis). Hg in air ranged 12-1600 ng/m^3. The highest concentrations of T-Hg were recorded in the samples taken from St.2. T-Hg concentrations in water were 2.5, 100 and 15.7 ng/l for Sts.1, 2 and 3, respectively. The proportions of MeHg to the T-Hg were 2.3, 0.1 and 1.3%, respectively, which may reflect the contamination with inorganic mercury from the mine. However, the highest MeHg concentration was observed in St.3 with the value of 0.21 ng/l, which was two times higher than 0.10 ng/l of St.2. This may be due to methylation of inorganic mercury released from the mine during the period of flowing down the river. Extremely high content of Hg^0, 25%, was observed in St.2 and a significant correlation was found between concentrations of Hg^0 and mercury in air (R^2 = 0.999). It can be considered that airborne mercury in this area depends primarily on Hg^0 in wastes from the mine.