Occurrences of sulfide minerals in the basement rocks associated with the Midcontinent Rift in the Midwestern United States

THAKURTA, J.* AND HINKS, B.D.

Department of Geosciences, Western Michigan University, Kalamazoo, MI 49008 USA
(*correspondence: joyashish.thakurta@wmich.edu)

The 1.1 Ga old Midcontinent Rift zone is well known for volcanic and plutonic activities as well as for the occurrences of significant quantities of Cu, Ni and PGE sulfide deposits associated with the magmatic rocks primarily in northern Michigan and Minnesota. Important examples include the magmatic sulfide mineral deposits hosted within the large Duluth gabbroic complex [1] and within the recently discovered Eagle [2] and Tamarack [3] intrusions. The source of extraneous sulfur, responsible for sulfide saturation of the magma and the formation of metal-rich sulfide liquids, has been frequently questioned. The basement rocks of the Eagle deposit in northern Michigan include Paleoproterozoic metasedimentary rocks of the Marquette Range Supergroup underlain by the Middle to Late Archean gneissic and granitic rocks. Recent exploration at the Baraga Basin area of northern Michigan has revealed significant quantities of disseminated sulfide minerals not only in the Paleoproterozoic slaty and schistose rocks of the Baraga Group but also consistently within the Archean gneissic rocks. The large abundances of sulfide minerals in the country rocks indicate the possibility of similar conduit-like magmatic sulfide deposits in the Midcontinent Rift area for sustainable development of metallic mineral resources.

[1] Ripley et al. (1998) *Geochim. Cosmochim. Acta*, **62**, 3349-3365. [2] Ding et al. (2010) *Geochem. Geophys. Geosyst.*, **11**, Q03003. [3] Taranovic et al. (2015) *Lithos*, **212-215**, 16-31.