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Control of shearing on myrmekite formation in granitoid bodies along the North Purulia Shear Zone

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Myrmekites within the granitoid bodies along the North Purulia Shear Zone, India, occur in three principle ways viz. along rims of perthite or alkali feldspar porphyroclasts, within perthite or alkali feldspar porphyroclasts, and along boundaries of clustered K-feldspar grains that formed as a reaction rim between large plagioclase and quartz grains. Myrmekites when present tend to be located along zones parallel to the foliation, which may be mylonitic or any other variety. The boundaries along which myrmekites formed were almost always either normal to, or at a high angle with the direction of maximum compressive stress. Along boundaries parallel to the maximum compressive stress myrmekites were absent. This suggests that stress must have acted as a controlling factor for the selection of sites where myrmekites formed. Moreover, some granitic bodies showed presence of foliation at the outcrop and deformation twinning accompanied with other deformation markers under the microscope, but lacked any signature of shearing either at the outcrop or under the microscope. Myrmekites were absent in those granitoid rocks. Such an observation also points towards the importance of shearing and the related stress and strain distribution in the formation of myrmekites. Granitoid bodies less affected by shearing contained myrmekites in two modes. They occurred along rims of alkali feldspar and perthite porphyroclasts, as well as along grain boundaries of K-feldspar clusters formed as a reaction rim between big plagioclase and quartz grains. In mylonites and other strongly deformed rocks, myrmekites existed either along rims of perthite and alkali feldspar porphyroclasts, or within such porphyroclasts which had been altered by some fluid through cracks that cut across the porphyroclasts. Myrmekites, when present within this porphyroclasts, generally tend to be located around those cracks that fractured the porphyroclasts and also showed evidence of some fluid activity through them. The presence of myrmekites along grain boundaries of K-feldspar clusters and alongside cracks within the porphyroclasts, demonstrates that the movement of fluid along existing pathways was an important factor in deciding the myrmekite forming site. The relative percentage of myrmekites within the porphyroclasts beside cracks to those rimming the porphyroclasts, increases as the rocks get more sheared. Such an observation may imply that with increasing shearing, pathways of fluid activity becomes the predominant factor in determining myrmekite forming sites, rather than the distribution of strain within the rock body caused by shearing.