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Comments on *Novel regular quinquehedral packing obtained by the local approach* by V. V. Manzhur

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Abstract

Comments are made on a paper by Manzhur [*Acta Cryst.* (1996), **A52**, 645–646] where the author gives the impression that there is no detailed information available on packings in R^3 .

In the introduction of his paper (Manzhur, 1996), the author gives the impression that little detailed information on packings in R^3 is known so far. This opinion seems to be caused by the author's lack of familiarity with part of the crystallographic literature. There exist, however, extensive studies on sphere packings (Fischer, 1973, 1974, 1991*a,b*, 1993; Koch & Fischer, 1992, 1995), on Dirichlet partitions (Engel, 1981*a,b*; Koch, 1973; Shtogrin, 1973) and on the interplay of both these concepts (Koch, 1984; Zobetz, 1983).

Manzhur claims to have derived a 'novel regular quinquehedral packing', *i.e.* a homogeneous sphere packing with five contacts per sphere. This sphere packing, however, is well known (Fischer, 1991*a*, p. 77) and belongs to type $5/4/t6$. In total, there exist 125 types of tetragonal and 52 types of cubic sphere packings with contact number 5. Square-pyramidal coordination is attained not only in $5/4/t6$ for $c/a = 6^{1/2} =$

2.4495, but also in $5/4/t5$ for $c/a = 4 - 12^{1/2} = 0.5359$ ($P4_2/mmc$; Fischer, 1991*a*, p. 76) and in $5/3/c3$ (the configuration of boron in CaB_6 , $Pm\bar{3}m$; Fischer, 1973, p. 137). The author's speculation, that his 'novel' packing might be the only one of this kind, therefore, turns out to be wrong.

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