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Letter to the Editor

## On the meaning and use of *homochiral*

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The stereochemical term *homochiral*, employed to indicate that a compound or a sample consists of only one enantiomer, appears occasionally in articles published in the *Journal* (e.g., [1–3]). This *macroscopic* usage of the term (i.e., applied to bulk material as opposed to individual molecules) first appeared in the literature in the mid-1980's [4]. However, the original meaning of *homochiral* as defined by Lord Kelvin – who introduced the term at the end of the 19th century – refers to the stereochemical *relationship* between *molecules* (or between substituents, moieties, etc., within a molecule) that have the same sense of chirality. The two usages (molecular and macroscopic, respectively) are clearly different, and their co-existence has produced controversy and intense debate that have persisted for well-over a decade. For a detailed discussion of the history and other aspects of the *homochiral* problem, see [4].

The new, macroscopic, usage of *homochiral* arose for understandable reasons, viz. (a) the existence of a need for a suitable new term for macroscopic enantiomeric homogeneity; (b) some undeniable advantages of *homochiral* in the macroscopic usage; and (c) a distant link between the two meanings. Nevertheless, the co-existence of the two distinct usages is highly undesirable, for several reasons. First, it is clearly ill-advised in general to apply the same term in different meanings. Second, due to the existence of the two usages, *homochiral* can be

ambiguous, and the intended meaning is in fact difficult if not impossible to ascertain in some cases. Third, such duality of usage is also undesirable from a *pedagogic* viewpoint, and, indeed, some who teach stereochemistry are frustrated by the dilemma of the dual usage of *homochiral*. All in all, there is no doubt therefore that the macroscopic usage of *homochiral* should be discontinued and that the term should be exclusively reserved for use in its original meaning of a stereochemical relationship. It is important to note in this regard that most leading experts and practitioners of stereochemistry now agree on this point, i.e. that macroscopic *homochiral* should be abandoned (e.g., [5–8]). It is to be hoped, therefore, that the readers of the *Journal* will consider this issue and elect to refrain from using *homochiral* in the macroscopic sense.

Scientific journals have a fundamental role in assuring the rational, accurate, and clear usage of nomenclature and terminology. It would be important therefore for the *Journal of Chromatography* to examine the usage of *homochiral*, hopefully with the result that the use of the term in the *Journal* will be restricted to its original meaning, i.e., the stereochemical relationship between molecules that have the same sense of chirality. As outlined above, such a limitation in the use of *homochiral* is scientifically correct and necessary; furthermore, this restriction is also needed if we are to end the futile and seemingly endless controversy around this terminology ques-

tion, a controversy that is undoubtedly harmful to the clarity, general understanding, and teaching of stereochemistry and its various applications.

As mentioned above, however, there *is* a real need for a suitable term for samples of single-enantiomeric content, and the macroscopic usage of *homochiral* cannot reasonably be eliminated without making available a suitable replacement; indeed, a major reason for the persistence of the *homochiral* problem has been the lack of such a replacement [4]. It is *essential* therefore to provide a replacement when eliminating macroscopic *homochiral*. A large number of potential candidates for this role have been used or proposed in the literature, including *homoenantiomeric*, *enantiomerically pure*, *enantiopure*, *optically pure*, *optically active*, *scalemic*, *holemic*, etc. As discussed in detail elsewhere, several of these terms are useful and important, but none is suitable as a general replacement for macroscopic *homochiral* [4]. The present author has therefore proposed a new term, *unichiral*, as the replacement; this term appears suitable and advantageous

[4]. It would seem important, therefore, that both the *Journal* and its readers consider the merits of this new term and, it is hoped, adopt it as the replacement for macroscopic *homochiral*.

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