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ORA Thesis: "Electron energy loss spectroscopy of fullerene materials"

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Reference:

Rebecca Jane Nicholls , (2006). Electron energy loss spectroscopy of fullerene materials . DPhil, University of Oxford

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Title: Electron energy loss spectroscopy of fullerene materials

Abstract:

This thesis is comprised of two closely related studies of fullerenes. The first part is an investigation of C60 and C70 nanocrystals using both experimental and simulated electron energy loss (EEL) spectra. Through a detailed comparison of particular features in EEL spectra collected from these materials in a transmission electron microscope, with simulated spectra, it is established that differences in spectra from different materials can be linked to particular aspects of the structural models. For example, in the case of C60 differences in experimental spectra from different samples can be linked to differences in the bond lengths within the molecules of different samples. In the case of C70, it is found that features within the spectrum which have previously been attributed to the ten equatorial atoms do not have this origin in a crystal. The second part is an experimental investigation of endohedral fullerenes Nd@C82 and Sc3N@C80. The effect of temperature on the EEL spectrum is investigated and, in the case of Nd@C82, the effect of the presence of different isomers is also investigated. Spectra are successfully obtained from the encapsulated atoms, and the importance of careful experiments in terms of avoiding contamination is highlighted.

Type of Award: DPhil

Level of Award: Doctoral

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Title

Knowing and understanding

Subtitle

Relations between meaning and truth, meaning and necessary truth, meaning and synthetic necessary truth

Abstract

The avowed aim of the thesis is to show that there are some synthetic necessary truths, or that synthetic apriori knowledge is possible. This is really a pretext for an investigation into the general connection between meaning and truth, or between understanding and knowing, which, as pointed out in the preface, is really the first stage in a more general enquiry concerning meaning. (Not all kinds of meaning are concerned with truth.) After the preliminaries (chapter one), in which the problem is stated and some methodological remarks made, the investigation proceeds in two stages. First there is a detailed inquiry into the manner in which the meanings or functions of words occurring in a statement help to determine the conditions in which that statement would be true (or false). This prepares the way for the second stage, which is an inquiry concerning the connection between meaning and necessary truth (between understanding and knowing apriori). The first stage occupies Part Two of the thesis, the second stage Part Three. In all this, only a restricted class of statements is discussed, namely those which contain nothing but logical words and descriptive words, such as "Not all round tables are scarlet" and "Every three-sided figure is three-angled". (The reasons for not discussing proper names and other singular definite referring expressions are given in Appendix I.)

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Aaron Sloman

Supervisor

D.F. Pears

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Institution

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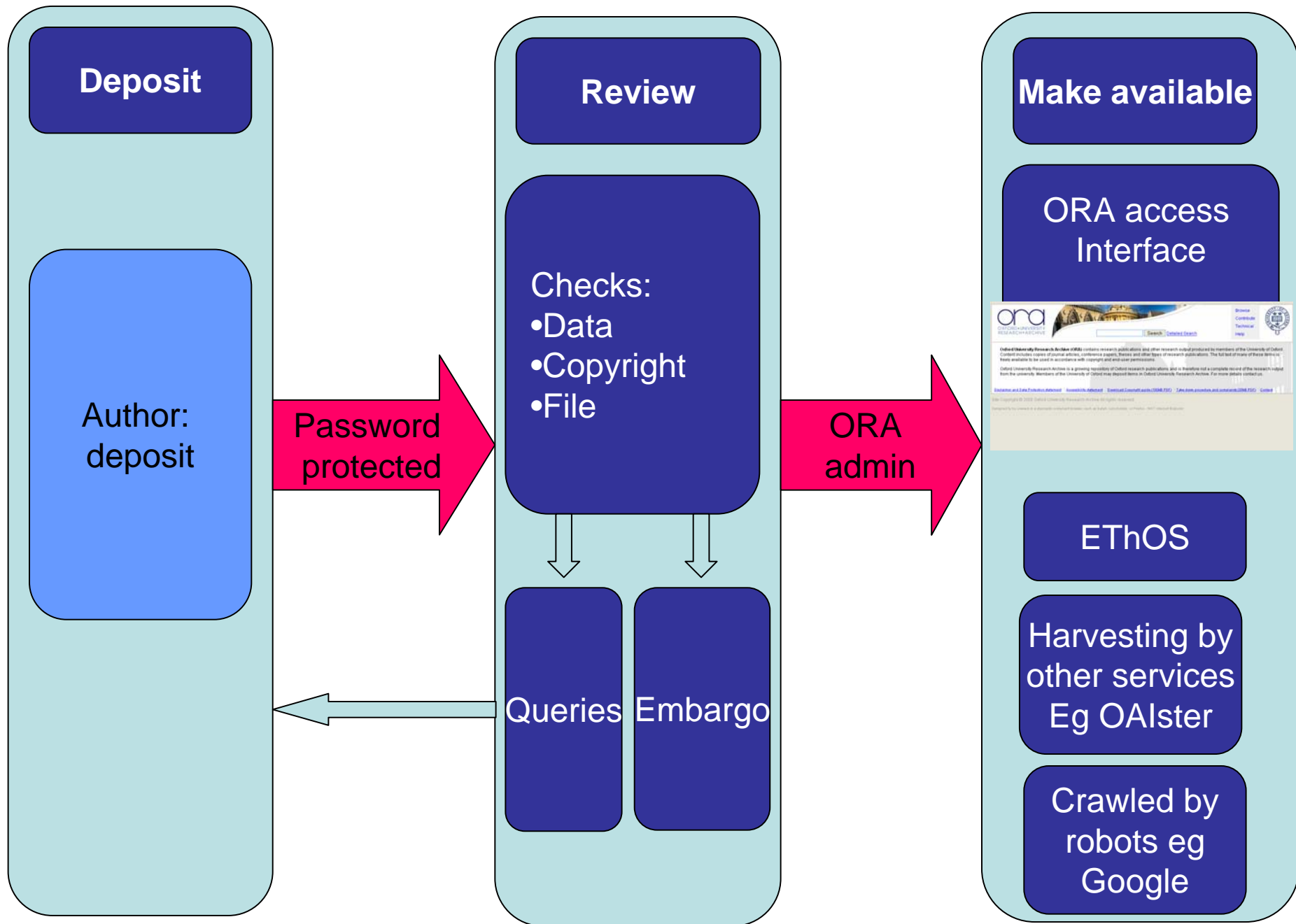
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