

**FULLERENE DIANIONS REVEALED BY ELECTROSPRAY MASS SPECTROMETRY :
C₈₄²⁻ AND C₉₀²⁻**

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We have observed the dianions of the fullerenes C₈₄ and C₉₀ in the negative-ion electrospray mass spectrometry (EMS) of specific solutions of a commercial sample of a mixture of higher fullerenes (C_n, n = 60, 70, 76, 78, 84, 86, 88, 90, 92, 94, 96) which contains mostly C₈₄ (41%) and amounts varying between 4 and 9% of the other fullerenes. Only C₈₄⁻ and C₉₀⁻ appear as strong monoanion peaks with only slight indications of the other fullerene monoanions. The dianions C₈₄²⁻ and C₉₀²⁻ also appear strongly indicating that they are formed sequentially from their respective monoanions. The solvent conditions required for dianion formation require a low polarity aromatic solvent supporting the fullerenes in solution (here o-dichlorobenzene) and a polar hydrophilic solvent to support electronic charge (here methanol). While C₈₄²⁻ has recently been observed in the isolated state, this is the first observation of the intrinsically stable C₉₀²⁻. Semiempirical (AM1) calculations of the structures and electron affinities of C₈₄ and C₉₀, as well as the other fulleride species are being undertaken to attempt to explain the preferential formation of these two dianions in the solution environment.

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